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3924 MEADE ST.
DENVER, COLORADO

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SUPPLEMENTAL DATA TO PHOTOFACT FOLDER 7 IN SET 276

PHILCO CHASSIS TV-300, TV-301, A, W

Philco Models 22C4119, 22C4120, L, 22C4123, 22C4124, L and 22C4310 (Ch. TV-300, TV-301) were covered in Photofact Folder 7 — Set 276.

Model additions and late production changes were covered in Production Change Bulletin 139 — Set 299-1.

The alignment instructions given on pages 6 and 7 are in error. The correct alignment procedure is given with the publication of this bulletin.

PRODUCTION CHANGES
BULLETIN 143

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

Allow 15 minutes for receiver and test equipment to warm up. There must be a good bond between the chassis and test equipment.
Connect the deflection yoke and speaker during alignment.
Do not remove the horizontal oscillator tube (V12) to disable the high voltage. The high voltage lead should be securely taped and kept away from chassis.

VIDEO IF ALIGNMENT

Set the contrast and brightness control fully clockwise.
Connect the negative lead of a 5 volt battery to point (A). Positive lead to chassis. The IF tube shield must be in place during alignment.
Set the channel selector switch to UHF position.
Connect the synchronized sweep voltage from the sweep generator to the horizontal input of the oscilloscope for horizontal deflection.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
1.	Direct	Marker to point H. Low side to chassis.	Not used	45.5MC (400∿Mod at 30%)	1	Vert. Amp to point (B) Low side to chassis	A1	Adjust scope for 40 volts peak to peak. Adjust A1 for maximum amplitude.
2.	"	"	"	43.1MC	"	"	A2	"
3.	"	"	"	42.7MC	"	"	A3	"
4.	"	"	"	45.0MC	"	"	A4	"
5.	"	"	"	44.4MC	"	"	A5	"
6.	Fig. 1	Across antenna input thru matching network. (Fig.1)	69MC (6MC Swp)	70.25MC 67.25MC 42.5MC	4	"		Check response curve (Fig.2) for curve limits. Readjust A1, A2, A3, A4 and A5 for proper limits of response curve in Fig. 2. Adjust A1 and A4 for carrier level. Adjust A5 for correct curve level. Adjust A2 and A3 for 70.25MC slope. Only adjust above SLIGHTLY. If they require more than slight turning, repeat steps 1 thru 5.

SOUND IF ALIGNMENT USING AM SIGNAL GENERATOR AND VTVM

Remove the first video IF tube (V3) from its socket.
Set the volume control fully clockwise.
Leave bias connected as in "Video IF Alignment".

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	CHANNEL	CONNECT VTVM	ADJUST	REMARKS
7.	2200Ω Carbon Resistor	High side to point (D) thru 2200Ω. Low side to chassis.	4.5MC (400∿Mod at 30%).	Any	DC probe thru crystal detector to point (B). Common to chassis	A6	Adjust for MINIMUM deflection.
8.	"	"	4.5MC	"	DC probe thru crystal detector to point (E). Common to chassis	A7, A8, A9	Attenuate signal generator to prevent overloading. Adjust for maximum deflection. Replace V3. Disconnect the test equipment and tune in a good TV station. Note if audio buzz is present. If necessary, readjust A8 for MINIMUM buzz and clearest sound.

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SOUND IF ALIGNMENT USING FM SIGNAL GENERATOR AND OSCILLOSCOPE

Remove V3 from its socket. Connect bias as under "Video IF Alignment".
Use frequency modulated signal with 60% modulation and 450KC sweep. Use 120% sawtooth voltage in scope for horizontal deflection.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
7.	2200Ω Carbon Resistor	High side to point (D). Low side to chassis.	4.5MC (450KC Swp)	4.5MC	Any	Vert.Amp. to point (F). Low side to chassis	A7, A9	Disconnect stabilizing capacitor (C2). Increase generator output for reading on scope. Adjust for curve of maximum amplitude and symmetry similar to Fig. 3.
8.	"	"	"	"	"	Vert.Amp to point (G). Low side to chassis.	A8	Reconnect stabilizing capacitor (C2). Adjust so that 4.5MC occurs at crossover lines as shown in Fig. 4. SLIGHTLY re-adjust A7 for maximum amplitude and straightness of crossover lines. Replace V3 in its socket.

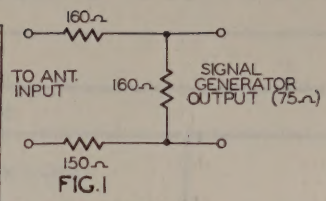


FIG. 1

ALTERNATE 4.5MC TRAP ALIGNMENT

Tune in a TV station and turn the fine tuning control clockwise until a 4.5MC beat pattern appears in picture. Adjust A8 for MINIMUM 4.5MC beat in picture.

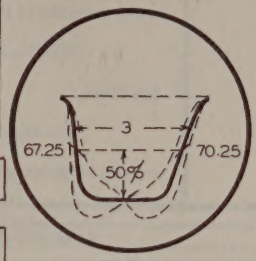


FIG. 2

OSCILLATOR ALIGNMENT

Disconnect the white lead going to tuner AGC from main chassis. Connect the negative lead of a 1.5 volt battery to loose end. Positive lead to chassis.
Set the fine tuning control to the mid-position of its range.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
9.	Two 120Ω Carbon Resistors	Across antenna with 120Ω in each lead.	Not used	257MC 251MC 245MC 239MC	13 12 11 10	Vert.Amp. thru 1KΩ to point (H). Low side to chassis near mixer tube(V2)	A10, A11, A12, A13	Adjust for zero beat on scope. If regeneration occurs, increase bias as high as 4.5 volts if necessary.
10.	"	"	"	233MC 227MC	9 8	"	A14	Adjust A14 for channel 9 frequency. Then recheck A14 for channel 8 frequency. Recheck channel 9 frequency. If necessary, make a compromise adjustment.
11.	"	"	"	221MC	7	"	A15	Adjust A15 for zero beat on scope. Recheck steps 9, 10 and 11. If necessary, readjust until channels are within 500KC of their proper frequencies.
12.	"	"	"	129MC	6	"	A16	Adjust for zero beat on scope.
13.	"	"	"	113MC	4	"	A17	"
14.	"	"	"	101MC	2	"	A18	"

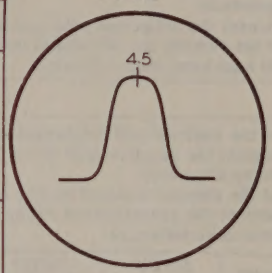


FIG. 3

RF AND MIXER ALIGNMENT

Connect the bias supply as under "Oscillator Alignment".
Disconnect tuner coupling link at the IF terminal strip near V3 and solder a 68Ω resistor to the open end of the lead from the tuner. Remove V3 from its socket. Adjust scope controls so that the width is double the height.
Connect the synchronized sweep voltage from the sweep generator to the horizontal input of the oscilloscope for horizontal deflection.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
15.	Fig. 1	Across antenna terminals with (Fig.1) antenna matching unit.	213MC (10MC Swp)	213MC	13	Vert.Amp. to point (H). Low side to chassis near mixer tube (V2).	A19, A20	Check for response curve similar to Fig.5. If response is not flat between limits shown, detune A19 counter clockwise until single peak appears. Adjust A20 until peak falls on 213MC marker. Adjust A19 for response similar to Fig. 5.
16.	"	"	177MC (10MC Swp)	177MC	7	"	A21, A22	Check for response indicated by dotted lines as in Fig. 6A and 6B. Adjust A21 and A22 for mirror image of original response curve. (Tilt in opposite direction.). If response curve appears as in Fig.6A, adjust A21 and A22 until curve appears as in Fig.6B. This adjustment over compensates to allow for channel 13 adjustment in next step. Repeat steps 15 and 16 until centered and symmetrical response curves are obtained on channels 7 and 13.
17.	"	"	85MC (10MC Swp)	85MC	6	"	A23, A24, A25	Adjust for symmetrical response approximately at center of bandpass. Adjust A23 counter clockwise until single peak appears. Adjust A24 until peak falls on 85MC marker. Adjust A25 for maximum curve amplitude and symmetry of single peak. Retouch SLIGHTLY, if necessary, A23 and A24 for symmetrical response centered at approximately the 85MC marker point.

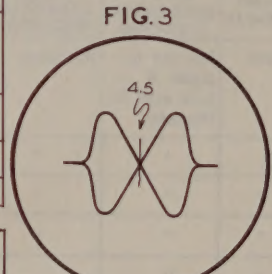


FIG. 5

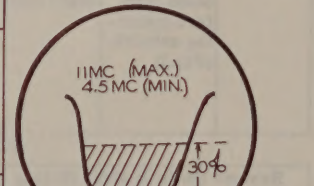


FIG. 6A

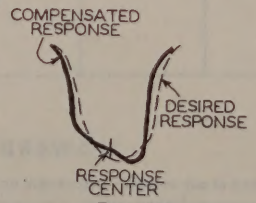
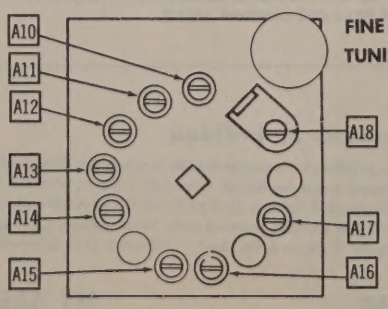
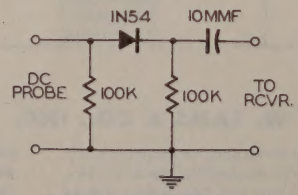


FIG. 6B



OSCILLATOR ADJUSTMENTS



CRYSTAL DETECTOR

SUPPLEMENTAL DATA TO PHOTOFACT FOLDER 8 IN SET 216	
	Pacific Mercury Models 2217, 2218, X, 2224 and 2284 (Ch. 200-11) were covered in Photofact Folder 8 – Set 216. CORRECTION NOTICE The RCA replacement width coil (20IR1) listed in the parts list on page 15 is a typographical error. The RC correct replacement for the width coil (part #PMA-56003) is 21IR1. The horizontal oscillator circuit shown on the main shematic, page 2, is in error. A partial schematic is given in Fig. 1 showing the correct version.
	Models 3414 (Ch. 200-23 and radio Ch. 150) and model 5414 (Ch. 200-23) are electrically identical to the models covered, except for the following changes.
	NEW UHF TUNER The UHF tuner is changed to part #PMC-57009. This tuner has been properly aligned at the factory and is very stable. Alignment of this tuner should not be required in the field. A schematic of this tuner is given in Fig. 2.
	NEW PICTURE TUBE Models 3414 and 5414 may use either a 21YP4 or a 21AFP4 picture tube.
	RADIO ADDED Model 3414 is electrically identical to model 5414, except it contains a radio (Ch.150) A schematic of this radio (Fig.3) and alignment procedure are given in this bulletin.
	The following production changes apply to all models. A1 (L35) has been decreased from 44MC to 43.9MC. A3 (L29) has been decreased from 44.6MC to 44MC. A5 (L33) has been increased from 45.1MC to 45.35MC.
Previous to Serial No. 93,600	R106 was omitted.
Previous to Serial No. 104,350	R94 was omitted.
Previous to Serial No. 105,800	R106 was connected to the 450V line.
Previous to Serial No. 158,573	A 2.7KΩ resistor connected in series with the blue lead of the tuner (cascode tuner only) was omitted.
Previous to Serial No. 160,725	A 10KΩ resistor connected from pin 3 of V7 to ground was omitted. A 1500MMF capacitor which connects from pin 1 of V7 to ground is not used.
Previous to Serial No. 162,000	A 100MMF capacitor was connected from terminal 7 to terminal 3 of T3 (horizontal output transformer).
Serial No. 160,300 & Up.	C3 was decreased from 20MFD to 8MFD and removed from the 280V line and connected to ground.

PACIFIC MERCURY MODELS 2217, 2218, X, 2224, 2284 (Ch. 200-11), 3414, 5414 (Ch. 200-23)

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ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

Turn the Radio-TV-Phono function switch to "Radio" position.
To set pointer, turn tuning capacitor fully closed and set pointer exactly 5/8" from left edge of dial panel background.
Loop should be maintained in same relative position to chassis as when receiver is in cabinet.
Set volume and tone controls at maximum position. Output of signal generator should be no higher than necessary to obtain an output reading. Use an insulated alignment screwdriver for adjusting.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	BAND SWITCH POS.	RADIO DIAL SETTING	OUTPUT METER	ADJUST	REMARKS
1.	.01MFD	High side to antenna stator lug on tuning gang. Low side to chassis.	455KC (400\Mod)	Radio	Tuning gang fully open	Across voice coil	A1, A2, A3, A4	Adjust for maximum deflection.
2.	"	"	1620KC	"	"	"	A5	"
3.	"	"	600KC	"	Tune to 600KC signal	"	A6	"
4.		Loop	1400KC	"	Tune to 1400KC signal	"	A7	Fashion loop of several turns of wire and radiate signal into loop of receiver. Adjust for maximum output.

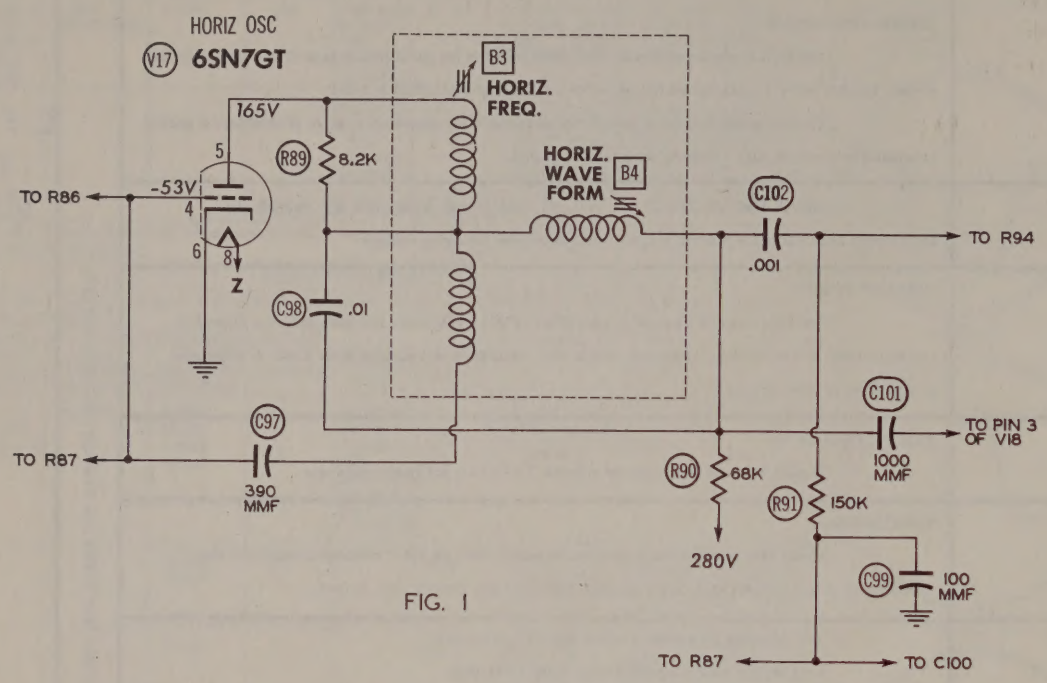

HORIZ OSC
V17 6SN7GT
B3
HORIZ. FREQ.
165V
R89 8.2K
HORIZ. WAVE FORM B4
C102
.001
TO R94
TO R86
-53V
C98 .01
C101
1000 MMF
TO PIN 3 OF V18
C97
390 MMF
TO R87
R90 68K
R91 150K
280V
C99 100 MMF
TO R87
TO C100

FIG. 1

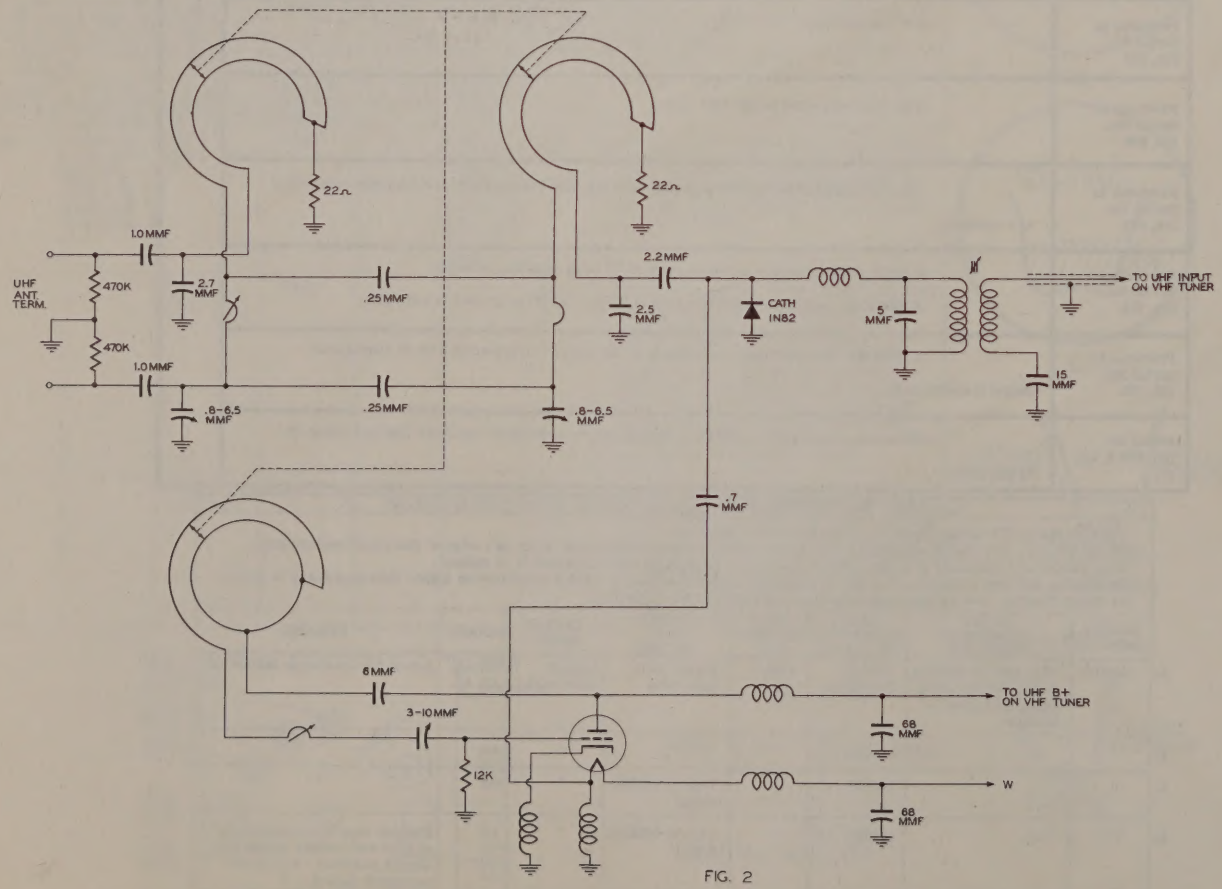

22Ω
22Ω
1.0 MMF
UHF ANT. TERM.
470K
2.7 MMF
470K
1.0 MMF
.25 MMF
.8-6.5 MMF
.25 MMF
.8-6.5 MMF
2.2 MMF
2.5 MMF
CATH 1N82
5 MMF
15 MMF
TO UHF INPUT ON VHF TUNER
.7 MMF
6 MMF
3-10 MMF
12K
68 MMF
68 MMF
TO UHF B+ ON VHF TUNER
W

FIG. 2

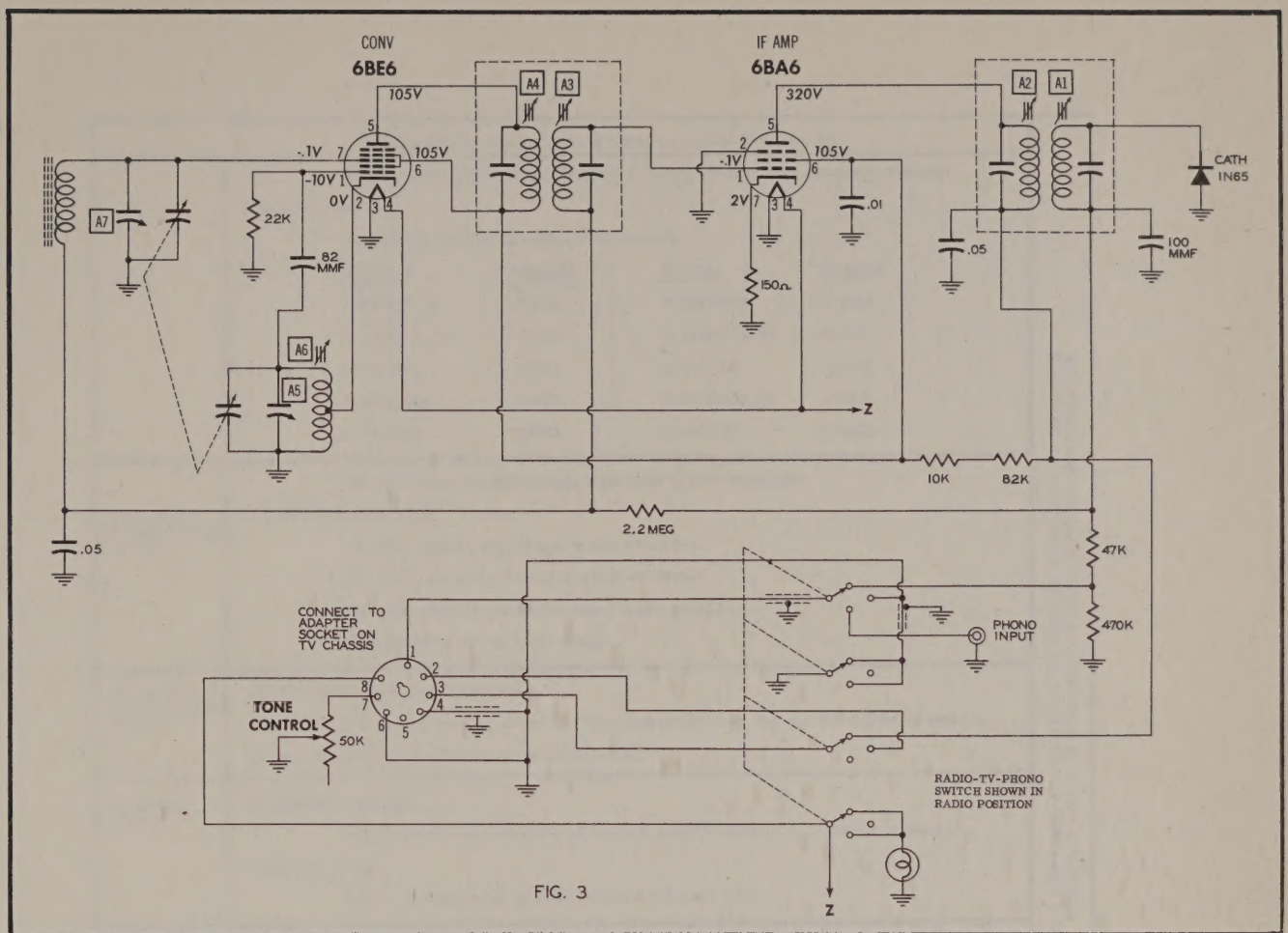


FIG. 3

SUPPLEMENTAL DATA TO PHOTOFACT FOLDER 10 IN SET 202

Westinghouse Chassis V-2216-4, -5 and V-2217-4, -5 were covered in Photofact Folder 10 — Set 202.

Model H-681T17 (Ch. V-2215-3) is electrically identical except for the following changes.

Chassis V-2215-3 employs a 17HP4 picture tube.

NEW CONTROL

The shafts on the volume and picture controls are shorter. The horizontal and brightness controls are located on the back of the chassis. Listed below are the new controls and the replacements for each.

CONTROLS

ITEM No.	RATING		REPLACEMENT DATA					INSTALLATION NOTES
	RESISTANCE	WATTS	Westinghouse PART No.	CENTRALAB PART No.	CLAROSTAT PART No.	IRC PART No.	MALLORY PART No.	
R1A	1500Ω	½	V-9877-1	F1-7	RTV-317	QJ-149 * ②	UF152R	Contrast-Panel
B	500KΩ	½		R2-47 ①			UR55-T54 ③	Volume-Tapped @50KΩ-rear
C	Switch			KB-1			US-26	Attach to R1B
R2A	125KΩ	½	V-10911-1	AB-43	A47-150K-S	Q11-228	U-415	Horiz. Hold
B	Shaft		Not Req.	AK-3	FS-3	Not Req.	Not Req.	Attach to R2A
R3A	50KΩ	½	V-9916-1	AB-31	A47-50K-S	Q11-123	U-35	Brightness
B	Shaft		Not Req.	AK-4	KSS-3	Not Req.	Not Req.	Attach to R3A

① Universal replacement (Centralab exact duplicate control part #SBBT-565-S).
② IRC concentrikit equivalent: Kit K-2, Base Element & Shafts: B17-110, P1-128 (Panel)
B18-133X, R2-212 (Rear)
76-1 (Switch)
③ Universal replacement (Mallory exact duplicate control part #UE186S).

NEW POWER TRANSFORMER

T1, power transformer changed to part #V-9958-1. Listed below are the replacement transformers, and proper installation notes.

HALLDORSON	MERIT	RCA	STANCOR	THORDARSON	TRIAD
P9737 ①	P-3061 ②	201T6 ②	A-8166 ①	26R16 ②	R-62BC ①③

① Ignore additional 6.3V filament winding.
② Use high current 5V rectifier winding.
③ Connect both filament leads to single high current 6.3V winding.

(Con't on reverse side)

WESTINGHOUSE MODEL H-881T17
(Ch. V-2215-3)

NEW DEFLECTION YOKE

T4, deflection yoke changed to part #V-10911-1. Listed below are the replacement yokes.

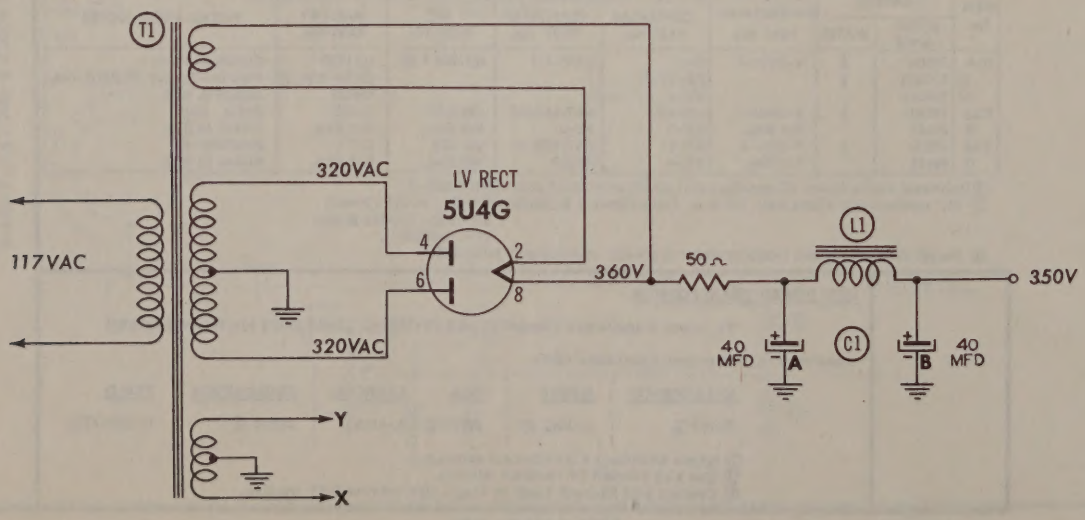
HALLDORSON	MERIT	RCA	STANCOR	THORDARSON	TRIAD
DF602	MDF-70	206D1	DY-2A	Y-6	Y-21-1

COMPONENT CHANGE

R108 is omitted.

R114 is omitted and R113 is decreased from 10KΩ to 6.8KΩ, 2 watts.

Only one 5U4 low voltage rectifier is used. A partial schematic is given below showing the circuit arrangement.



SUPPLEMENTAL DATA TO PHOTOFACT FOLDER 10 IN SET 281	
	Westinghouse chassis V-2310, V-2312, V-2320 and V-2322 were covered in Photofact Folder 10 — Set 281. Following is a list of all models being covered. MODEL / CHASSIS / MODEL / CHASSIS H-799T17, B / V-2310 / H-868TU21B / V-2322 H-799TU17, B / V-2320 / H-879T21(S), (V) / V-2312 H-867T21B / V-2312 / H-879TU21 / V-2322 H-867TU21B / V-2322 / H-880T21(S), (V) / V-2312 H-868T21B / V-2312 / H-880TU21 / V-2322
Ch. V-2310, V-2312, V-2320, V-2322	The following production changes were made in later production. TO IMPROVE BANDPASS L9, 2nd. video IF coil changed to part #V-9879-4. L12, 3rd. video IF coil changed to part #V-9879-4. M6, video detector assembly changed to part #V-12128-2. C34 is omitted with the above changes.
Ch. V-2310, V-2312, V-2320, V-2322	TO PREVENT VIDEO OVERLOADING Due to the variations in the 12BY7 tube characteristics a 10Ω resistor (R106) was added in the cathode circuit of the 12BY7 to prevent overloading.
Ch. V-2310, V-2312	COMPONENT CHANGE The horizontal multivibrator tube socket is mounted directly to the chassis in place of rubber grommets. R26 is omitted and R27 is decreased from 10KΩ to 6.8KΩ.
Ch. V-2310, V-2312, V-2320, V-2322	TO PREVENT "SPOOK" INTERFERENCE A 3.3 microhenry choke is added in the plate circuit of the damper tube (V15) to dampen out high frequency oscillations when the damper tube conducts.
Ch. V-2310, V-2312, V-2320, V-2322	TO IMPROVE HORIZONTAL AND VERTICAL SYNC R66 is increased from 22KΩ to 68KΩ. R65 is increased from 6.8KΩ to 10KΩ. R67 is increased from 12KΩ to 22KΩ. R68 is increased from 5.6KΩ to 6.8KΩ.
Ch. V-2312, V-2322	In later production of chassis V-2312 and V-2322 the RF tuner is changed to part # V-15460-1. A schematic and alignment procedure are given in this bulletin.
Ch. V-2310, V-2312, V-2320, V-2322	NEW PICTURE TUBE A 21AUP4A picture tube is used in many late production models.

WESTINGHO USE MODELS H-799T17, B, H-799TU17, B, H-867T21B, H-867TU21B, H-868T21B, H-868TU21B, H-879T21(S), (V), H-879TU21, H-880T21(S), (V), H-880TU21(Ch. V-2310, V-2312, V-2320, V-2322)

RF AND MIXER ALIGNMENT FOR TUNER V-15460-1

This portion of the receiver has been properly aligned at the factory and is very stable. Alignment of this portion of the receiver is not recommended in the field.

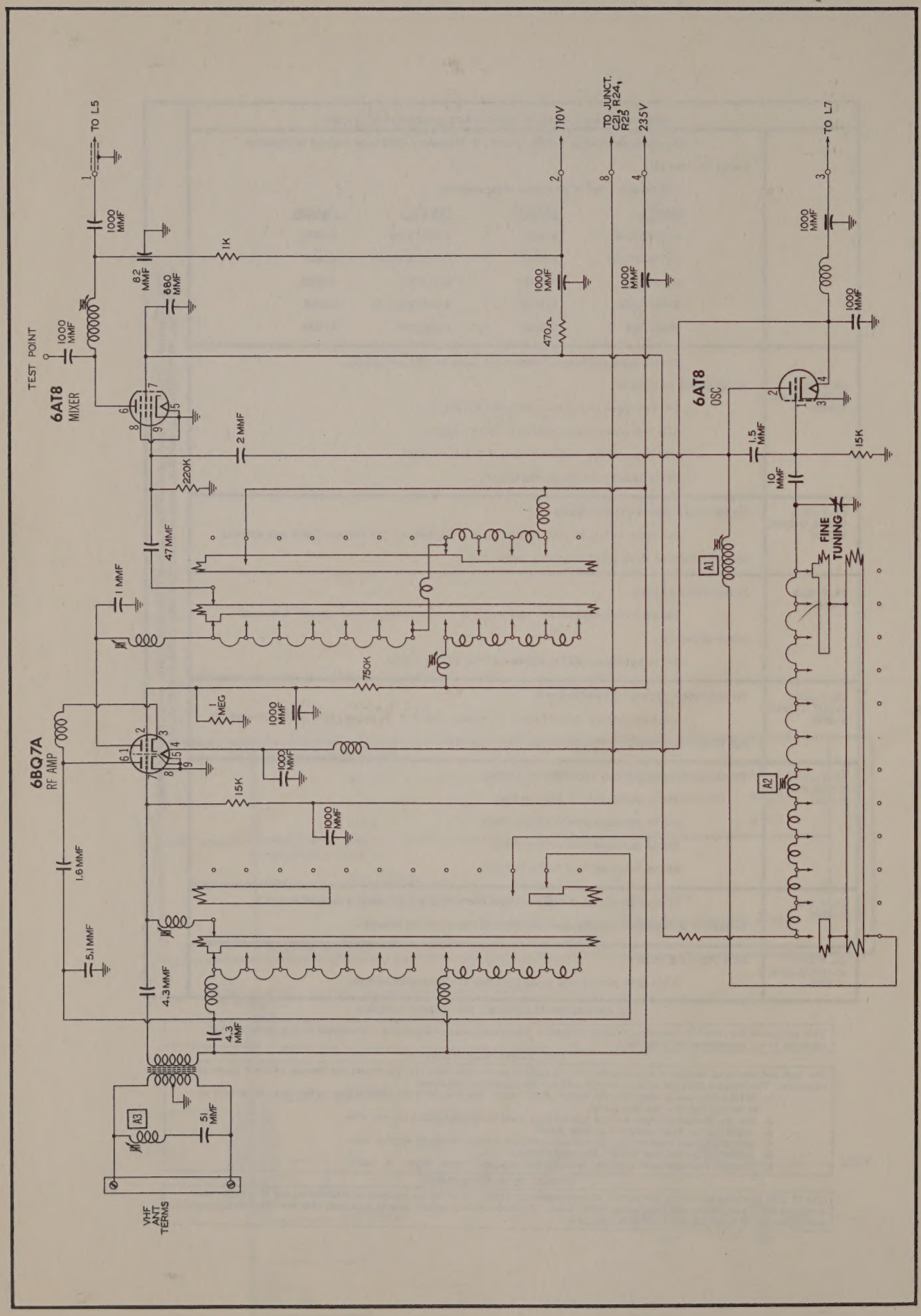
OSCILLATOR ALIGNMENT

The high and low-band oscillator adjustments (A1 and A2) are accessible when the fine tuning and channel selector knobs are removed. The chassis does not have to be removed for the oscillator alignment.

1. Set the fine tuning control to the center of its range (at this point the colored line on the drive wheel will be at the top and in a vertical plane).
2. Set the channel selector for the highest high-band station operating in your area.
3. Adjust A1 for best sound and picture detail.
4. Set the channel selector for the highest low-band station operating in your area.
5. Adjust A2 for the best sound and picture detail.
6. Recheck the high-band stations, if tuning has changed, repeat steps 1, 2, and 3.

40-48MC TRAP ADJUSTMENT

The IF trap has been pre-set at the factory at approximately 44MC. It is for the purpose of eliminating any IF interference from nearby transmitters operating in the 40MC band. If interference is noted, turn to a channel with the interference present and adjust the IF trap (A3) for maximum rejection.


TO L5
1000 MMF
1K
82 MMF
680 MMF
1000 MMF
470Ω
110V
TO JUNCT. C21, R24, R25
235V
1000 MMF
TO L7
1000 MMF
1000 MMF
TEST POINT
6AT8 MIXER
2 MMF
220K
47 MMF
1 MMF
750K
1 MEG
1000 MMF
1000 MMF
6BQ7A RF AMP
15K
1000 MMF
1.6 MMF
5.1 MMF
4.3 MMF
4.3 MMF
A3
51 MMF
VHF ANT TERMS
6AT8 OSC
1.5 MMF
15K
10 MMF
FINE TUNING
A1
A2

PHOTOFACT* Folder

AIRLINE MODELS GSL-4102A, B, C, GSL-4116A

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AIRLINE MODEL GSL-4102C

TRADE NAME	Airline Models GSL-4102A, GSL-4102B, GSL-4102C, GSL-4116A
SUPPLIER	Montgomery Ward & Co., 619 Chicago Ave., Chicago, Illinois
TYPE SET	Television Receiver
TUBES	Twenty
POWER SUPPLY	110-120 Volts AC-60 Cycle RATING 1.4 Amp. @ 117 Volts AC
TUNING RANGE	Channels 2 thru 13 VHF, 14 thru 83 UHF, Video IF 45.75MC, Sound IF 41.25MC (Intercarrier)

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AIRLINE MODELS GSL-4102A, B, C, GSL-4116A

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DISASSEMBLY INSTRUCTIONS

CHASSIS REMOVAL

1. Remove 5 push-on type control knobs from front panel of cabinet.

2. Remove 4 wood screws from 2 antenna terminal brackets on rear cover.

3. Remove 3 wood screws and loosen 2 wood screws. Remove rear cover.

4. Disconnect speaker plug.

5. Remove 8 chassis bolts. Remove chassis.

6. Remove 2 speaker nuts. Remove speaker.

NOTE: If it is necessary to remove the chassis for servicing, it is also necessary to remove the speaker. The speaker is the electro-magnetic type and must be connected for proper operation.

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MODELS

GSL-4102A, GSL-4102B, GSL-4102C, GSL-4116A

AIRLINE MODELS GSL-4102A, B, C, GSL-4116A

SERVICING IN THE FIELD

TUNER OSCILLATOR ADJUSTMENTS

Touch-up adjustment of the VHF tuner oscillator circuit may be accomplished as follows:

1. Set the selector knob to VHF position.
2. Tune in a TV station and set the fine tuning control to the center of its range.
3. Remove the channel selector and fine tuning knobs.
4. Adjustments are accessible one at a time thru the small hole above and slightly to the left of the channel switch shaft.

To adjust the UHF oscillator set the channel selector knobs to the desired UHF channel. The fine tuning knob should be at the center of its range. Remove knobs and adjust the oscillator slug thru the same hole as for VHF adjustments.

If two UHF channels are received and use the same UHF coil strips, the oscillator should be set for the channel closest to the center of the group.

PICTURE TUBE SAFETY GLASS CLEANING

To clean safety glass, remove 4 wood screws holding wood strip at the top edge of the safety glass. Remove wood strip and safety glass. Use extreme caution when removing safety glass.

PICTURE TUBE REMOVAL

For picture tube removal it is necessary to remove chassis. (See disassembly instructions).

SERVICE ADJUSTMENT LOCATION

See tube placement chart on page 5.

HORIZONTAL OSCILLATOR FIELD ADJUSTMENT

Adjustment of the horizontal oscillator circuit can be made from the rear panel of the chassis. Adjust the horizontal hold control (L32) until picture synchronizes horizontally.

SOUND IF DETECTOR BUZZ ADJUSTMENT

To eliminate sound IF detector buzz, adjust the ratio detector secondary (A8) located on top of chassis.

FUSES

One fuse is used for horizontal sweep circuit protection. (For location see tube placement chart).

CENTERING

Centering is accomplished mechanically by adjusting a magnetic ring around the neck of picture tube located flush against the yoke. Turn the knurled (disk-like) knob and at the same time rotate the ring around the tube until picture is properly centered.

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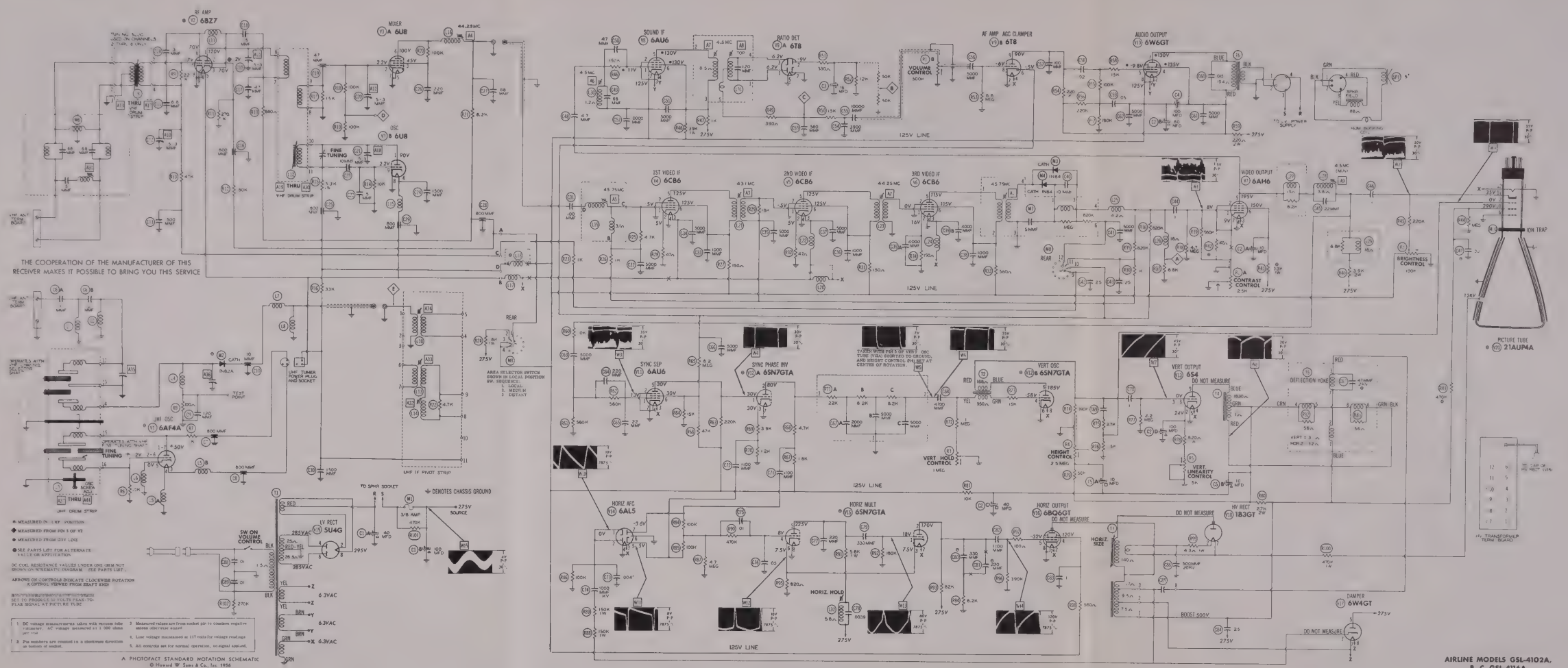

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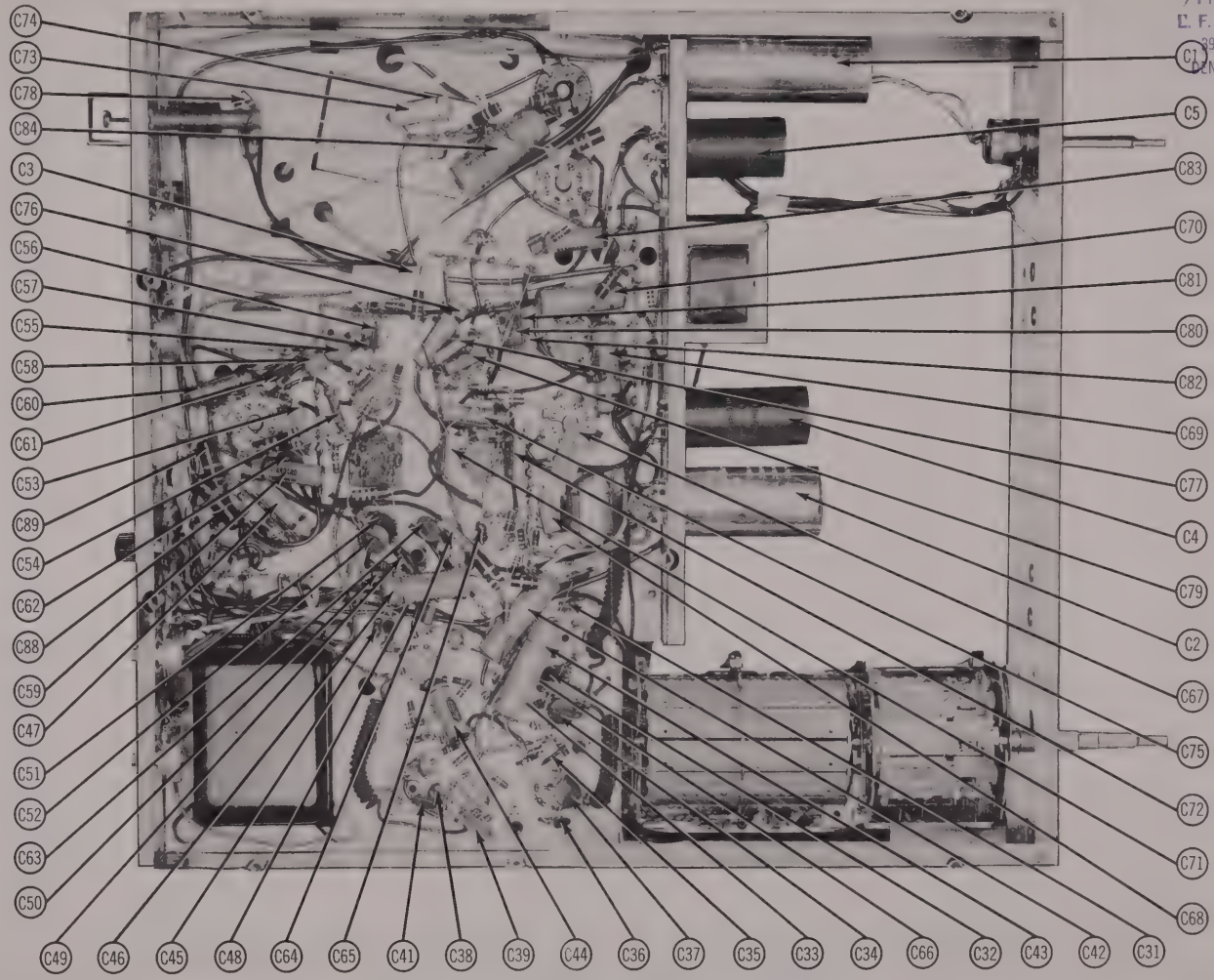
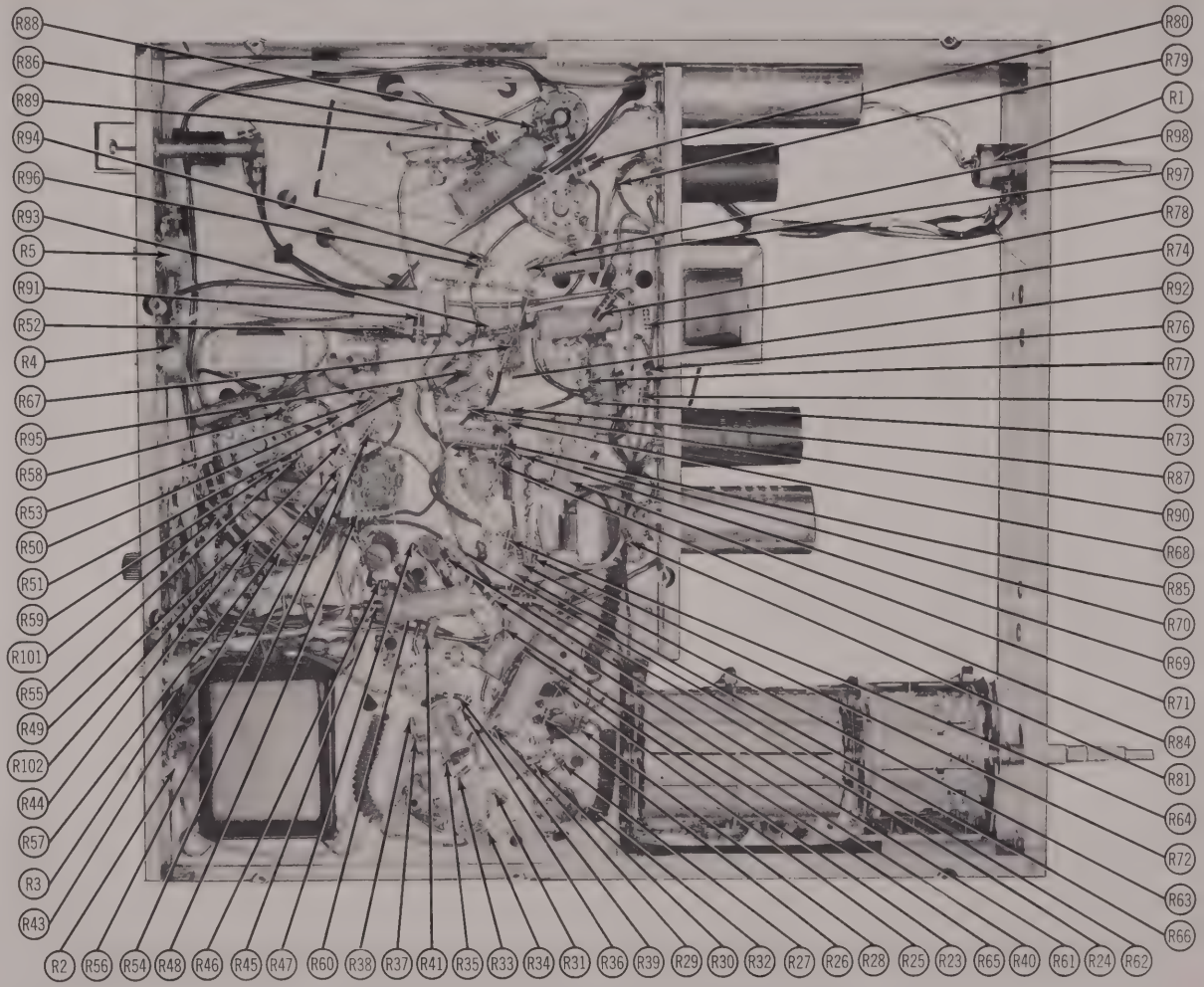


CHASSIS BOTTOM VIEW-CAPACITOR IDENTIFICATION



CHASSIS BOTTOM VIEW-RESISTOR IDENTIFICATION

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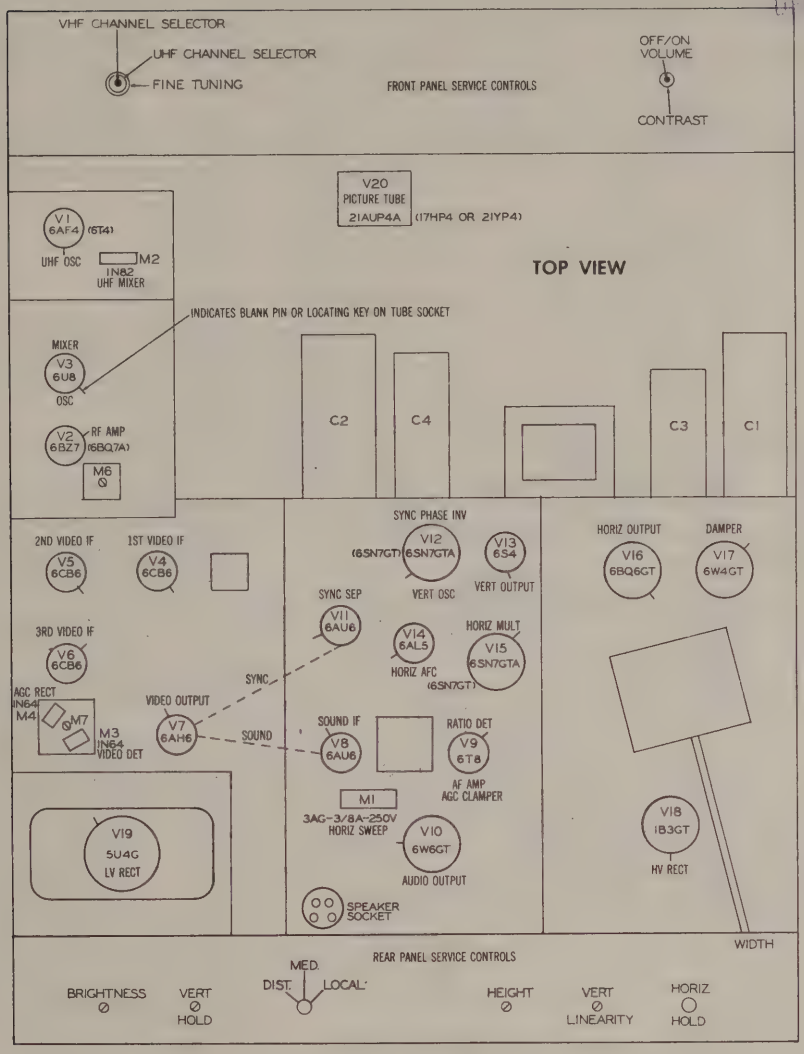
TUBE PLACEMENT CHART



TUBE FAILURE CHECK CHART

The following chart lists tubes whose failures are most likely to produce the indicated symptoms. Refer to tube placement chart for location and type of tube.

POWER SUPPLY FAILURE
No raster, no sound - **V19, Fuse (M1)**

LOSS OF PICTURE OR SOUND
No pic, no sound, has raster - **V3, V4, V5, V6, V7, V10 (V1 UHF only)**
No pic, no sound, has snow - **V2, V3, V4**
No pic, has sound, has raster - **V7, V20**
Has pic, no sound - **V8, V9, V10**
Overloaded picture - **V9**

SYNC FAILURE
No vert. sync - **V12**
No horiz. sync - **V12, V14, V15**
No vert. or horiz. sync - **V11, V12**

SWEEP FAILURE
No raster, has sound - **V15, V16, V17, V18, V20**
No vertical deflection - **V12, V13**
Poor vert. linearity or foldover - **V12, V13**
Poor horiz. linearity or foldover - **V15, V16, V17**
Narrow picture - **V15, V16, V17, V18, V19**
Vert. off freq. - **V12**
Horiz. off freq. - **V12, V14, V15**

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

The high voltage lead should be securely taped and kept away from chassis. Do not remove the horizontal multivibrator tube (V15) to disable the high voltage. Allow warm up time for receiver and test equipment before starting alignment.

VIDEO IF ALIGNMENT

Set channel selector between any two channels. This will disable the local oscillator and reduce the possibility of erroneous indications. Set AGC switch in "medium" position. Connect the negative lead of a 3 volt battery to the ungrounded side of C43. Connect the positive lead to chassis.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	CHANNEL	CONNECT VTVM	ADJUST	REMARKS
1.	Direct	High side to an ungrounded tube shield floating over converter tube (V3). Low side to chassis.	45.75MC (Unmod.)	Set between any two channels.	DC probe to point (A). Common to chassis.	A1	Adjust for maximum deflection. Attenuate signal generator to maintain not more than 2 volts at VTVM.
2.	"	"	44.25MC (Unmod.)	"	"	A2	"
3.	"	"	43.1MC (Unmod.)	"	"	A3	"
4.	"	"	44.25MC (Unmod.)	"	"	A4	Detune adjustment A5 by rotating slug out to maximum Then adjust A4 for maximum deflection.
5.	"	"	45.75MC (Unmod.)	"	"	A5	Adjust for maximum deflection on VTVM. Attenuate generator output to maintain not more than 2 volts at VTVM.

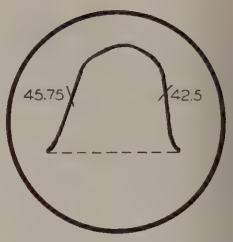


FIG.1

OVERALL VIDEO IF RESPONSE CHECK

Connect the synchronized sweep voltage from the sweep generator to the horizontal input of the oscilloscope for horizontal deflection.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
6.	Direct	High side to an ungrounded tube shield floating over converter tube (V3). Low side to chassis.	44MC (10MC Swp)	42.5MC 45.75MC	Set between any two channels	Vert. Amp. thru 47KΩ to point (A). Low side to chassis.		Adjust for response curve similar to Fig.1. Retouch A1 thru A5 for desired response. A1 and A4 affects 45.75MC marker. A2 affects 42.5MC marker. A3 and A5 affects bandwidth and tilt.

FI

SOUND IF ALIGNMENT USING AM SIGNAL GENERATOR AND VTVM

Remove V6 from its socket. Set contrast control to maximum contrast position. Connect two 50KΩ resistor across C3 for alignment point (C).

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	CHANNEL	CONNECT VTVM	ADJUST	REMARKS
7.	.001MFD	High side to pin 1 (grid) of Video Output Tube (V7). Low side to chassis.	4.5MC (Unmod.)	Any	DC probe to point (B). Common to chassis.	A6, A7	Adjust for maximum deflection. A7 is located on bottom of chassis.
8.	"	"	"	"	DC probe to point (C). Common to chassis.	A8	Adjust for zero reading. A positive and negative reading will be obtained on either side of the correct setting. Replace V6 in its socket.

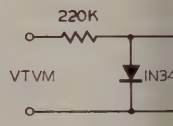


FIG.4

SOUND IF ALIGNMENT USING FM SIGNAL GENERATOR AND OSCILLOSCOPE

Remove V6 from its socket. Set contrast control to maximum contrast position. Use frequency modulated signal with 60% modulation and 450KC sweep. Use 120% sawtooth voltage in scope for horizontal deflection.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
7.	.001MFD	High side to pin 1 (grid) of video output tube (V7). Low side to chassis.	4.5MC (450KC Swp)	4.5MC	Any	Vert. Amp. thru 47KΩ to point (B). Low side to chassis.	A6, A7	Disconnect stabilizing capacitor (C3). Adjust for curve of maximum amplitude and symmetry similar to Fig. 2.
8.	"	"	"	"	"	Vert. Amp. thru 47KΩ to point (C). Low side to chassis.	A8	Reconnect C3. Adjust so that 4.5MC occurs at center of crossover lines as in Fig. 3. SLIGHTLY retouch A7 for maximum amplitude and straightness of crossover lines. Replace V6 in its socket.

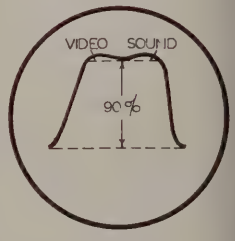


FIG.5

4.5MC TRAP ALIGNMENT

Set contrast control to maximum contrast position. Remove V6 from its socket.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	CHANNEL	CONNECT VTVM	ADJUST	REMARKS
9.	.001MFD	High side to pin 1 (grid) of Video Output Tube (V7). Low side to chassis.	4.5MC (Unmod.)	Any	DC probe thru detector (Fig. 4) to pin 11 (cathode) of picture tube. Common to chassis.	A9	Adjust for MINIMUM deflection on VTVM. Replace V6 in its socket.

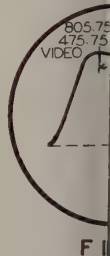
ALTERNATE 4.5MC TRAP ALIGNMENT

Tune in the strongest TV station available and note if any 4.5MC beat is present in picture. Adjust A9 for minimum 4.5MC beat, if necessary.

VHF RF AND MIXER ALIGNMENT

Ground the AGC line to chassis at terminal "D" on back of tuner.
Connect the synchronized sweep voltage from the sweep generator to the horizontal input of the oscilloscope for horizontal deflection.
The sweep generator output lead should be terminated with its characteristic impedance, usually 50 ohms.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
10	Two 120Ω Carbon Resistors	Across VHF antenna terminals with 120Ω in each lead.	207MC (10MC Swp)	205.25MC 209.75MC	12	Vert. Amp. thru 47KΩ to point (D). Low side to chassis.	A10, A11, A12	Adjust for response curve similar to Fig.5 with markers above 90%.
11.	"	"	213MC (10MC Swp)	211.25MC 215.75MC	13	"		Check each channel for response similar to Fig. 5. If markers fall below 70% on any channel make compromise adjustment of A10, A11 and A12 with channel switch set to that channel and recheck all channels to see that they have not been seriously affected. If channels 2 thru 6 cannot be aligned for proper response adjust A13 thru A17. These slugs are accessible thru hole in rear of tuner.
			201MC (10MC Swp)	199.25MC 203.75MC	11			
			195MC (10MC Swp)	193.25MC 197.75MC	10			
			189MC (10MC Swp)	187.25MC 191.75MC	9			
			183MC (10MC Swp)	181.25MC 185.75MC	8			
			177MC (10MC Swp)	175.25MC 179.75MC	7			
			85MC (10MC Swp)	83.25MC 87.75MC	6			
			79MC (10MC Swp)	77.25MC 81.75MC	5			
			69MC (10MC Swp)	67.25MC 71.75MC	4			
			63MC (10MC Swp)	61.25MC 65.75MC	3			
			57MC (10MC Swp)	55.25MC 59.75MC	2			



FI

ALIGNMENT INSTRUCTIONS

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

The high voltage lead should be securely taped and kept away from chassis. Do not remove the horizontal multivibrator tube (V15) to disable the high voltage. Allow warm up time for receiver and test equipment before starting alignment

VIDEO IF ALIGNMENT

Set channel selector between any two channels. This will disable the local oscillator and reduce the possibility of erroneous indications. Set AGC switch in "medium" position. Connect the negative lead of a 3 volt battery to the ungrounded side of C43. Connect the positive lead to chassis.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	CHANNEL	CONNECT VTVM	ADJUST	REMARKS
1.	Direct	High side to an ungrounded tube shield floating over converter tube (V3). Low side to chassis.	45.75MC (Unmod.)	Set between any two channels.	DC probe to point Ⓐ. Common to chassis.	A1	Adjust for maximum deflection. Attenuate signal generator to maintain not more than 2 volts at VTVM.
2.	"	"	44.25MC (Unmod.)	"	"	A2	"
3.	"	"	43.1MC (Unmod.)	"	"	A3	"
4.	"	"	46.25MC (Unmod.)	"	"	A4	Detune adjustment A5 by rotating slug out to maximum Then adjust A4 for maximum deflection.
5.	"	"	45.75MC (Unmod.)	"	"	A5	Adjust for maximum deflection on VTVM. Attenuate generator output to maintain not more than 2 volts at VTVM.

OVERALL VIDEO IF RESPONSE CHECK

Connect the synchronized sweep voltage from the sweep generator to the horizontal input of the oscilloscope for horizontal deflection

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
6.	Direct	High side to an ungrounded tube shield floating over converter tube (V3). Low side to chassis.	44MC (10MC Swp)	43.5MC 45.75MC	Set between any two channels	Vert. Amp. thru 47KΩ to point Ⓐ. Low side to chassis.		Adjust for response curve similar to Fig.1. Retouch A1 thru A5 for desired response. A1 and A4 affects 45.75MC marker. A3 affects 42.5MC marker. A3 and A5 affects bandwidth and tilt.

SOUND IF ALIGNMENT USING AM SIGNAL GENERATOR AND VTVM

Remove V6 from its socket. Set contrast control to maximum contrast position. Connect two 50KΩ resistor across C3 for alignment point Ⓒ.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	CHANNEL	CONNECT VTVM	ADJUST	REMARKS
7.	.001MFD	High side to pin 1 (grid) of Video Output Tube (V7). Low side to chassis.	4.5MC (Unmod.)	Any	DC probe to point Ⓑ. Common to chassis.	A6, A7	Adjust for maximum deflection. A7 is located on bottom of chassis.
8.	"	"	"	"	DC probe to point Ⓒ. Common to chassis.	A8	Adjust for zero reading. A positive and negative reading will be obtained on either side of the correct setting. Replace V6 in its socket.

SOUND IF ALIGNMENT USING FM SIGNAL GENERATOR AND OSCILLOSCOPE

Remove V6 from its socket. Set contrast control to maximum contrast position. Use frequency modulated signal with 60% modulation and 450KC sweep. Use 120v sawtooth voltage in scope for horizontal deflection.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
7.	.001MFD	High side to pin 1 (grid) of video output tube (V7). Low side to chassis.	4.5MC (450KC Swp)	4.5MC	Any	Vert. Amp. thru 47KΩ to point Ⓑ. Low side to chassis.	A6, A7	Disconnect stabilizing capacitor (C3). Adjust for curve of maximum amplitude and symmetry similar to Fig. 2.
8.	"	"	"	"	"	Vert. Amp. thru 47KΩ to point Ⓒ. Low side to chassis.	A8	Reconnect C3. Adjust so that 4.5MC occurs at center of crossover lines as in Fig. 3. SLIGHTLY retouch A7 for maximum amplitude and straightness of crossover lines. Replace V6 in its socket.

4.5MC TRAP ALIGNMENT

Set contrast control to maximum contrast position. Remove V6 from its socket.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	CHANNEL	CONNECT VTVM	ADJUST	REMARKS
9.	.001MFD	High side to pin 1 (grid) of Video Output Tube (V7). Low side to chassis.	4.5MC (Unmod.)	Any	DC probe thru detector (Fig. 4) to pin 11 (cathode) of picture tube. Common to chassis.	A9	Adjust for MINIMUM deflection on VTVM. Replace V6 in its socket.

ALTERNATE 4.5MC TRAP ALIGNMENT

Tune in the strongest TV station available and note if any 4.5MC beat is present in picture. Adjust A9 for minimum 4.5MC beat, if necessary.

VHF RF AND MIXER ALIGNMENT

Ground the AGC line to chassis at terminal "D" on back of tuner.
Connect the synchronized sweep voltage from the sweep generator to the horizontal input of the oscilloscope for horizontal deflection.
The sweep generator output lead should be terminated with its characteristic impedance, usually 50 ohms.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
10.	Two 130Ω Carbon Resistors	Across VHF antenna terminals with 130Ω in each lead.	207MC (10MC Swp)	205.25MC 209.75MC	12	Vert. Amp. thru 47KΩ to point Ⓐ. Low side to chassis.	A10, A11, A12	Adjust for response curve similar to Fig.5 with markers above 90%.
11.	"	"	213MC (10MC Swp)	211.25MC 215.75MC	13	"		Check each channel for response similar to Fig. 5. If markers fall below 70% on any channel make compromise adjustment of A10, A11 and A12 with channel switch set to that channel and recheck all channels to see that they have not been seriously affected. If channels 2 thru 6 cannot be aligned for proper response adjust A13 thru A17. These slugs are accessible thru hole in rear of tuner.
			201MC (10MC Swp)	199.25MC 203.75MC	11			
			195MC (10MC Swp)	193.25MC 197.75MC	10			
			189MC (10MC Swp)	187.25MC 191.75MC	9			
			183MC (10MC Swp)	181.25MC 185.75MC	8			
			177MC (10MC Swp)	175.25MC 179.75MC	7			
			85MC (10MC Swp)	83.25MC 87.75MC	6			
			79MC (10MC Swp)	77.25MC 81.75MC	5			
			89MC (10MC Swp)	87.25MC 71.75MC	4			
			83MC (10MC Swp)	81.25MC 65.75MC	3			
			57MC (10MC Swp)	55.25MC 59.75MC	2			

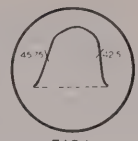


FIG. 1

FIG. 2

FIG. 3

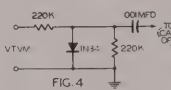


FIG. 4

FIG. 5

FIG. 6

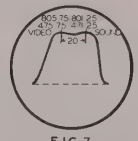


FIG. 7

VHF OSCILLATOR ALIGNMENT

Set AGC switch in medium position. The VHF channel adjustment screws are reached thru a hole just to the top of the channel switch shaft. The correct adjustment screw is accessible thru this hole as the channel switch is turned to each VHF channel. Connect the negative lead of a 3 volt battery to the ungrounded side of C43. Connect the positive lead to chassis. Connect the synchronized sweep voltage from the sweep generator to the horizontal input of the oscilloscope for horizontal deflection. The sweep generator output lead should be terminated with its characteristic impedance, usually 50 ohms.
Set the fine tuning control to the mid-position of its range.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
12.	Two 120Ω Carbon Resistors	Across VHF antenna terminals with 120Ω in each lead.	213MC (10MC Swp)	211.25MC 215.75MC	13	Vert. Amp. thru 47KΩ to point Ⓐ. Low side to chassis.	A19	Adjust to place sound marker in trap notch as in Fig. 8. Video marker should be at 50% on response curve. If all channels are off in same direction adjust A18 for proper response.
			207MC (10MC Swp)	205.25MC 209.75MC	12		A20	
			201MC (10MC Swp)	199.25MC 203.75MC	11		A21	
			195MC (10MC Swp)	193.25MC 197.75MC	10		A22	
			189MC (10MC Swp)	187.25MC 191.75MC	9		A23	
			183MC (10MC Swp)	181.25MC 185.75MC	8		A24	
			177MC (10MC Swp)	175.25MC 179.75MC	7		A25	
			83MC (10MC Swp)	83.25MC 87.75MC	6		A26	
			79MC (10MC Swp)	77.25MC 81.75MC	5		A27	
			69MC (10MC Swp)	67.25MC 71.75MC	4		A28	
			63MC (10MC Swp)	61.25MC 65.75MC	3		A29	
			57MC (10MC Swp)	55.25MC 59.75MC	2		A30	

40MC IF WAVE TRAP ADJUSTMENT

The IF wave trap should be tuned to minimize interference caused by signals which fall within the video IF band-pass (40-48MC). Tune in a station on which interference is noted and adjust A31 for minimum interference in the picture.

UHF TUNER ALIGNMENT

Normally alignment of this portion of the receiver is not recommended in the field. It has been properly aligned at the factory and is very stable
Check VHF tuner and IF stages for proper alignment before attempting UHF alignment.

UHF IF ALIGNMENT

Disconnect the RF cable going from UHF to VHF tuner at point Ⓐ. Connect bias as under VHF "Video IF Alignment". Set AGC switch in "medium" position.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
13.	.001MFD	High side to point Ⓐ. Low side to chassis. (150Ω impedance).	44MC (10MC Swp)	45.75MC 42.5MC 41.25MC	Any UHF Channel	Vert. Amp. thru 47KΩ to point Ⓐ. Low side to chassis	A32,A33 A34	Adjust for maximum response and curve similar to Fig. 1.

UHF RF ALIGNMENT

Reconnect RF cable going from UHF to VHF tuner thru a 100Ω carbon resistor. Ground pin 2 of V1 to make UHF Oscillator inoperative. Connect the synchronized sweep voltage from the sweep generator to the horizontal input of the oscilloscope for horizontal deflection. Set the fine tuning control to the mid-position of its range.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
14.	Two 130Ω Carbon Resistors	Across UHF antenna terminals with 120Ω in each lead.	803MC (20MC Swp)	801.25MC 805.75MC	69	Vert. Amp. across 100Ω which was added in series with UHF to VHF RF cable.	A35, A36	The position of markers must be within bandpass as in Fig. 7.
15.	"	"	473MC (20MC Swp)	471.25MC 475.75MC	14	"	"	Adjust for response curve similar to Fig. 7. Make compromise adjustments of A35 and A36 if necessary for correct bandpass. Turn back to channel 69 and recheck response curve at its frequency. Remove short from pin 2 of V1.

UHF OSCILLATOR ALIGNMENT

Connect bias as in VHF "Video IF Alignment". Set AGC switch in medium position. Set fine tuning control for 50% position of marker range. Set tuner notch to UHF position and remove knobs. The UHF oscillator adjustment screws are reached thru a hole just above and slightly to the left of the channel switch shaft. The correct adjustment screw is accessible through this hole as the channel switch is turned to each channel strip. Connect the synchronized sweep voltage from the sweep generator to the horizontal input of the oscilloscope for horizontal deflection. The sweep generator output lead should be terminated with its characteristic impedance, usually 50 ohms.

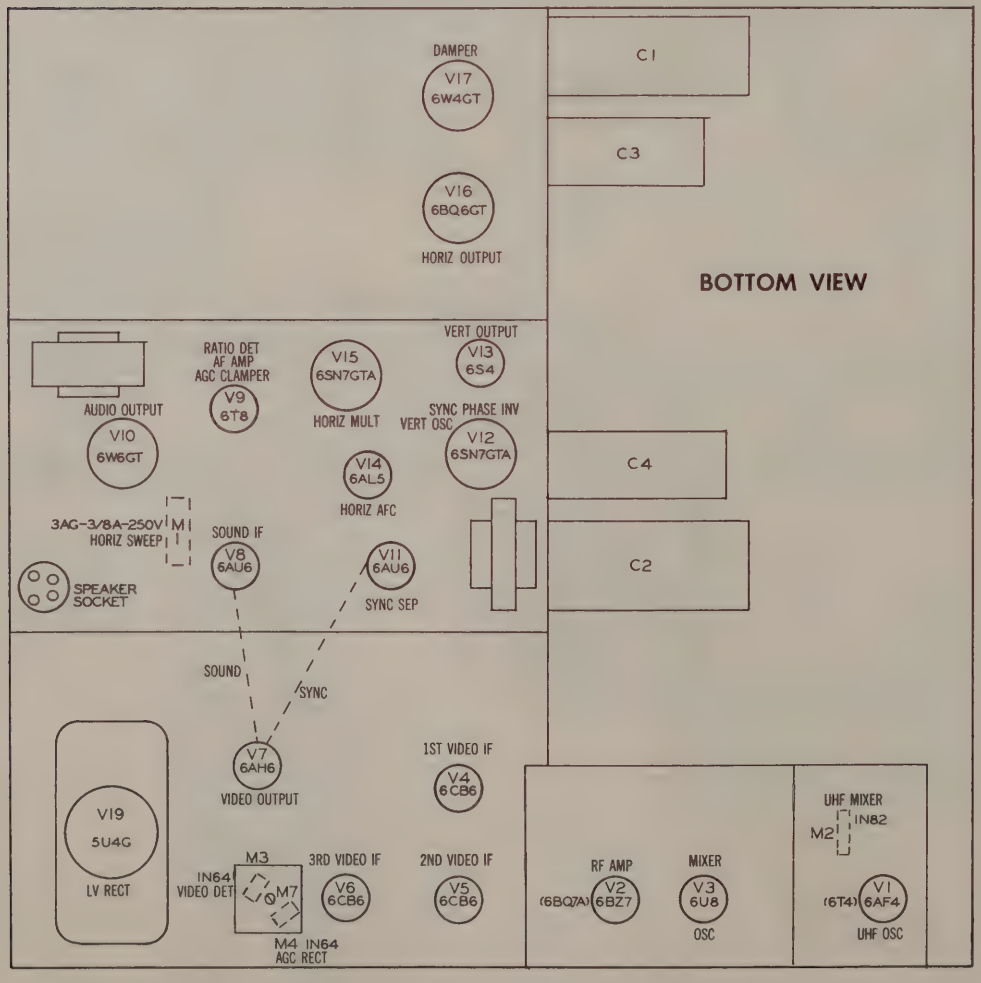
	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
16.	Two 120Ω Carbon Resistors	Across UHF antenna terminals with 120Ω in each lead.	473MC (20MC Swp)	471.25MC 475.75MC	14	Vert. Amp. thru 47KΩ to point Ⓐ. Low side to chassis.	A37	Adjust to place sound markers in trap notch as in Fig. 6. Video marker should be at 50%.
			515MC (20MC Swp)	513.25MC 517.75MC	21		A38	
			575MC (20MC Swp)	573.25MC 577.75MC	31		A39	
			635MC (20MC Swp)	633.25MC 637.75MC	41		A40	
			695MC (20MC Swp)	693.25MC 697.75MC	51		A41	
			755MC (20MC Swp)	753.25MC 757.75MC	61		A42	
			815MC (20MC Swp)	813.25MC 817.75MC	71		A43	
			875MC (20MC Swp)	873.25MC 877.75MC	81		A44	

PROPERTY OF
L. F. BLANKENSHIP
3924 MEADE ST.
DENVER, COLORADO

RESISTANCE MEASUREMENTS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8	Pin 9
V 1	6AF4A	*■4. 3KΩ	10KΩ	. 1Ω	0Ω	0Ω	10KΩ	*■4. 3KΩ		
V 2	6BZ7	■680Ω	130KΩ	INF	0Ω	. 1Ω	INF	1Meg	0Ω	0Ω
V 3	6U8	■3. 3KΩ	200KΩ	■100KΩ	. 1Ω	0Ω	■8. 2KΩ	0Ω	0Ω	10KΩ
V 4	6CB6	850KΩ	47Ω	. 1Ω	0Ω	■150Ω	■150Ω	0Ω		
V 5	6CB6	850KΩ	47Ω	. 1Ω	0Ω	■150Ω	■150Ω	0Ω		
V 6	6CB6	. 1Ω	150Ω	.1Ω	0Ω	■560Ω	■560Ω	0Ω		
V 7	6AH6	560KΩ	50Ω	. 1Ω	0Ω	†4KΩ	†33KΩ	50Ω		
V 8	6AU6	180KΩ	30KΩ	30KΩ	30KΩ	†1KΩ	†1KΩ	30KΩ		
V 9	6T8	INF	12KΩ	INF	. 1Ω	0Ω	820KΩ	0Ω	6. 8Meg	†220KΩ
V 10	6W6GT	NC	30KΩ	†500Ω	†300Ω	230KΩ	TP	30KΩ	30KΩ	
V 11	6AU6	1Meg	0Ω	. 1Ω	0Ω	■220KΩ	■30KΩ	0Ω		
V 12	6SN7GTA	■220KΩ	■6. 5KΩ	5KΩ	1. 5Meg	▲1Meg	0Ω	0Ω	. 1Ω	
V 13	6S4	NC	2. 5KΩ	2. 2Meg	. 1Ω	0Ω	2. 2Meg	NC	NC	▲4. 5KΩ
V 14	6AL5	100KΩ	100KΩ	. 1Ω	0Ω	4. 8Meg	NC	4. 8Meg		
V 15	6SN7GTA	180KΩ	†82KΩ	820Ω	5Meg	†5. 6KΩ	820Ω	. 1Ω	0Ω	
V 16	6BQ6GT	NC	. 1Ω	NC	■560Ω	390KΩ	NC	0Ω	0Ω	TOP CAP ▲17Ω
V 17	6W4GT	NC	NC	220KΩ	NC	†88Ω	NC	220KΩ	220KΩ	
V 18	1B3GT		PINS	1-8	HAVE	. INF	RESISTANCE			TOP CAP ▲157Ω
V 19	5U4G	INF	40KΩ	INF	25Ω	INF	27Ω	INF	40KΩ	
V 20	21AUP4A	0Ω	1. 5KΩ	PIN 6 0Ω	PIN 10 ▲470KΩ	PIN 11 ■150KΩ	PIN 12 . 1Ω			

*MEASURED IN "UHF" POSITION.
■MEASURED FROM 125V LINE.
†MEASURED FROM PIN 2 OF V19.
▲MEASURED FROM PIN 3 OF V17.
NC-NO CONNECTION.
TP-TIE POINT.



TUBE PLACEMENT CHART

PROPERTY OF
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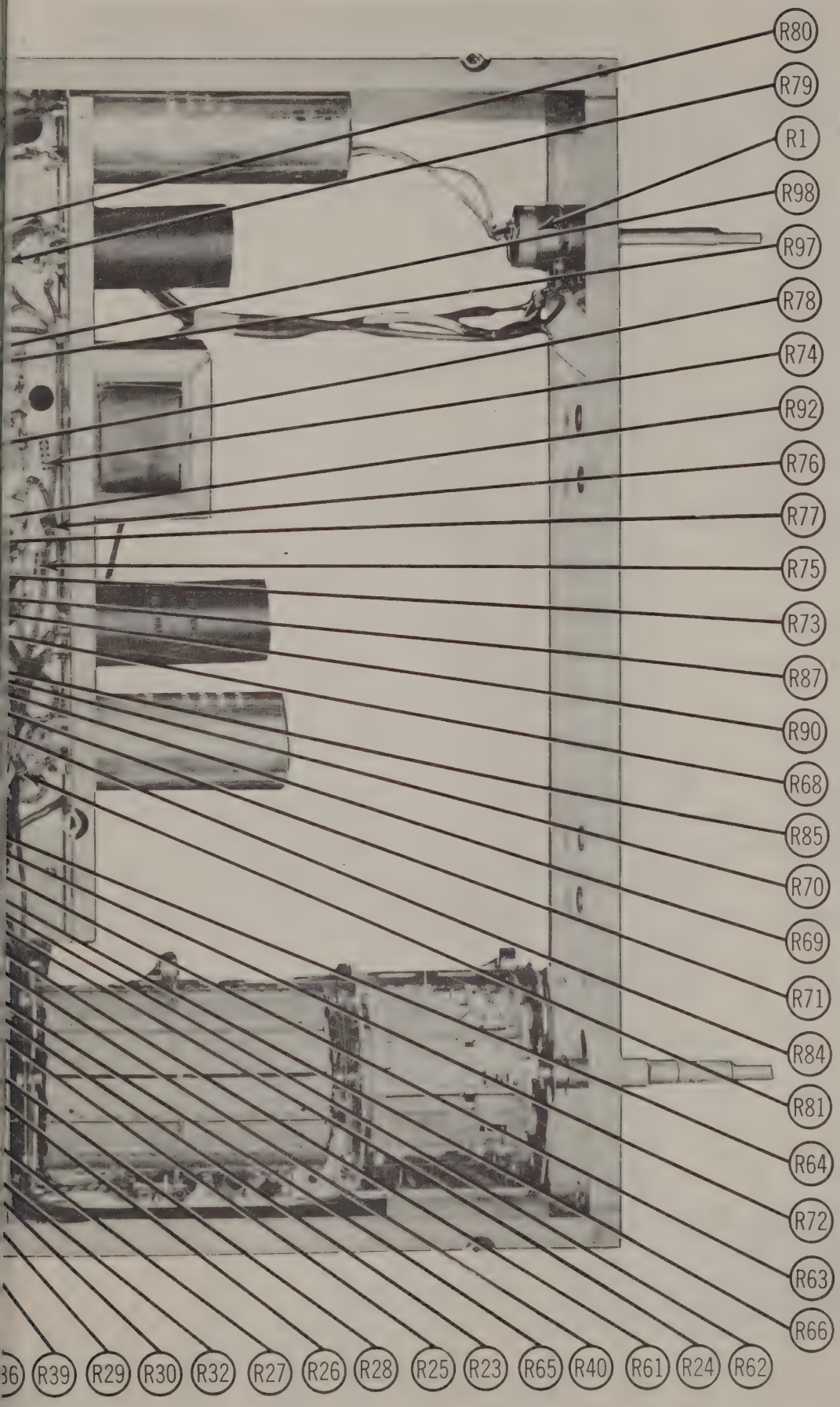
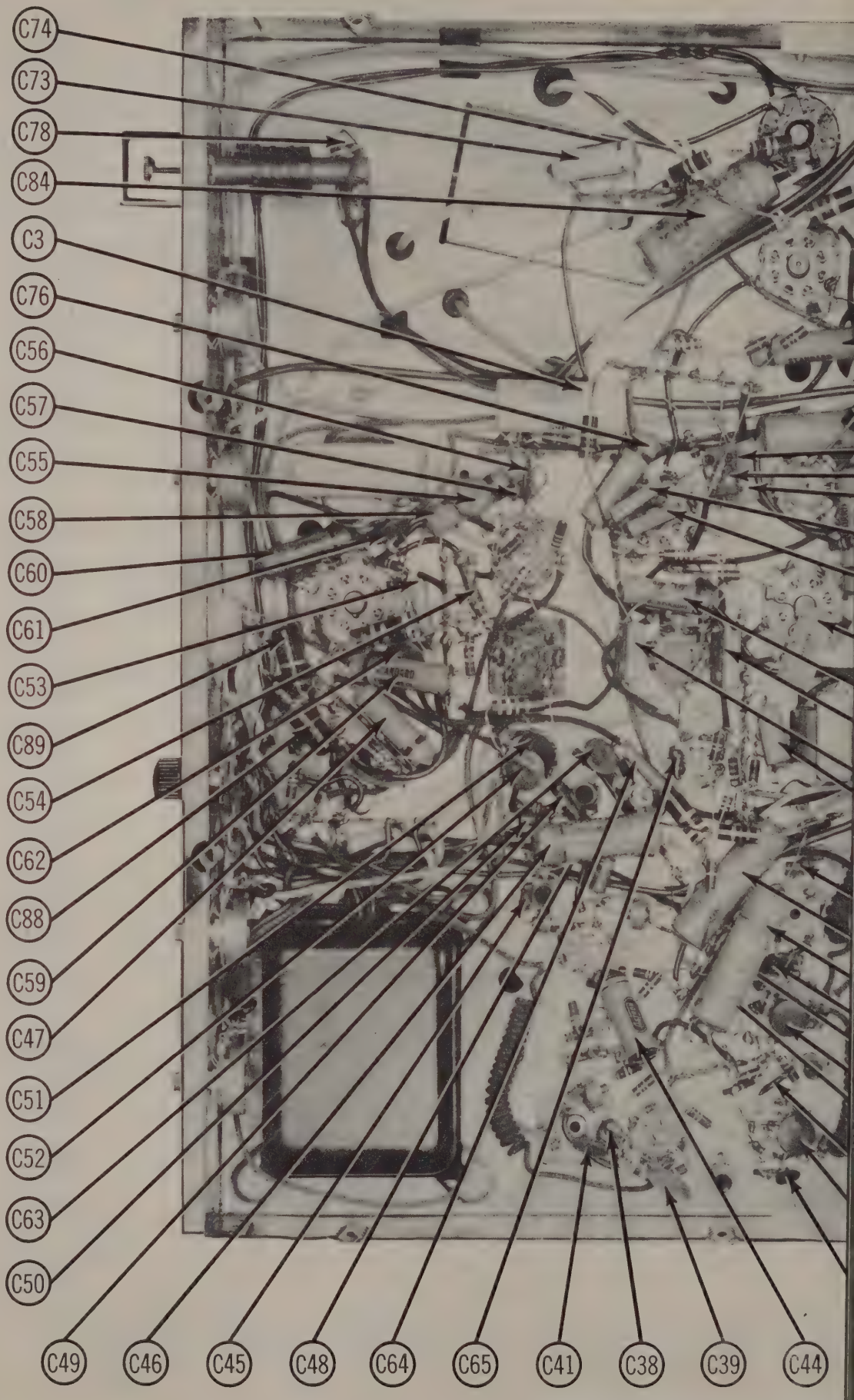
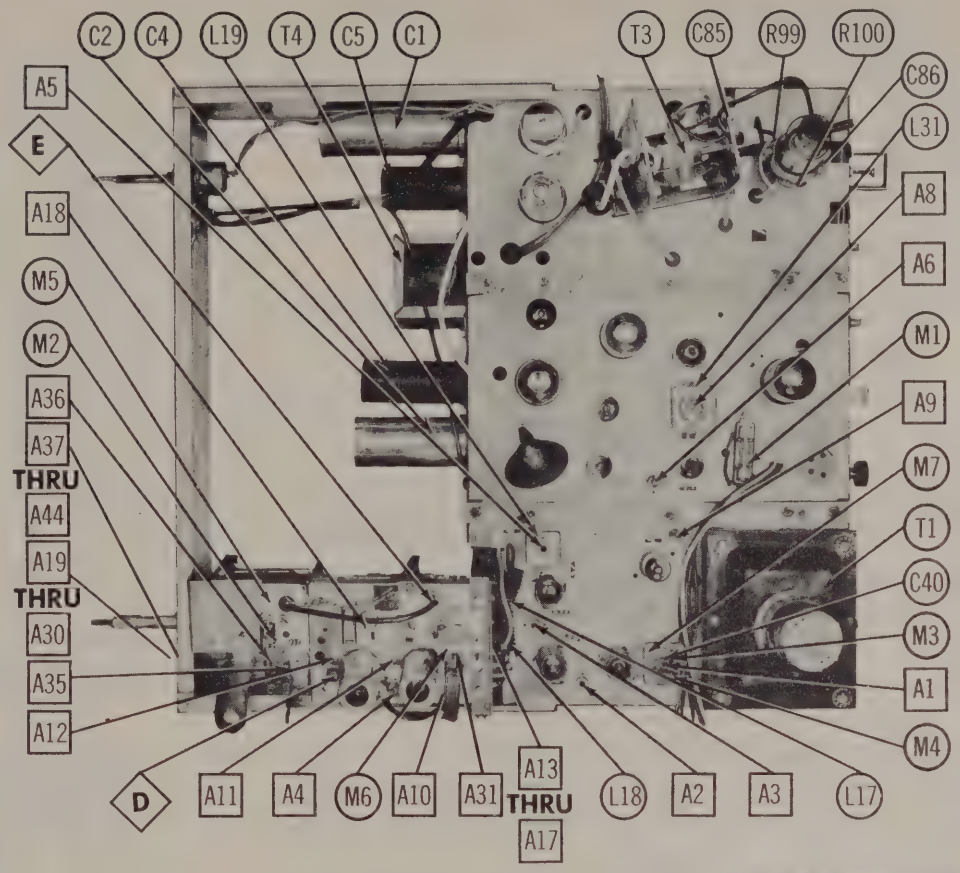
3024 MEADE ST.
DENVER, COLORADO



ESISTOR IDENTIFICATION

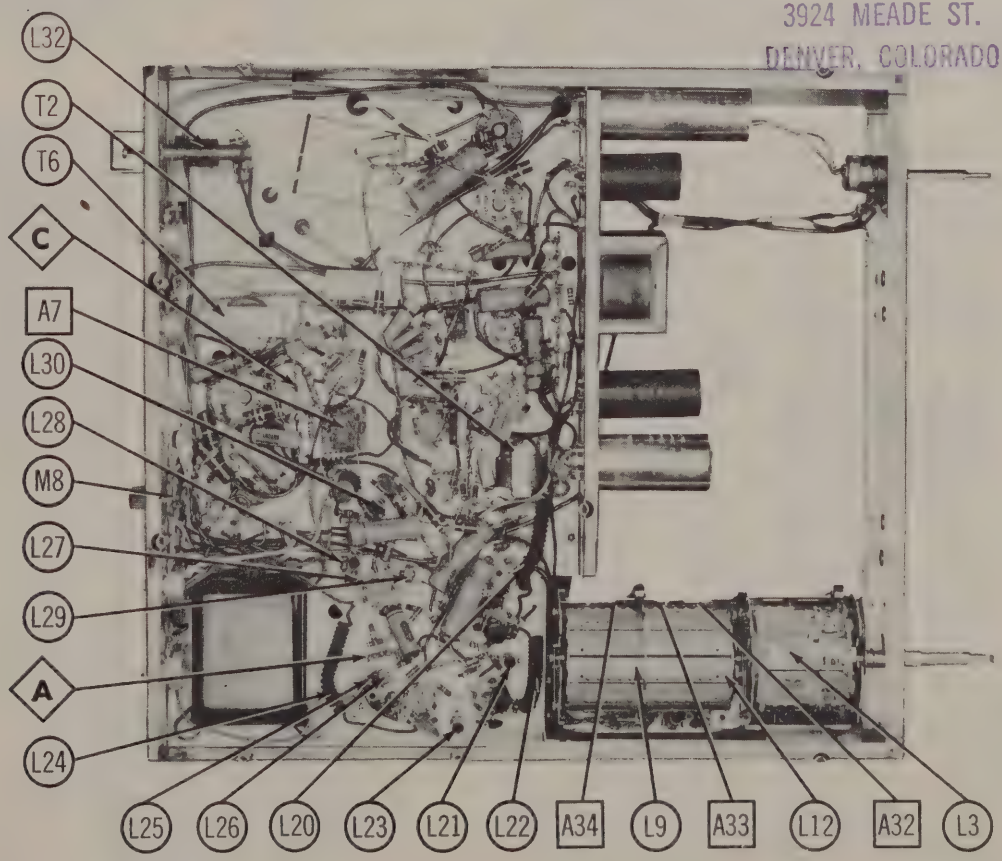


CHASSIS BOTTOM VIEW-C



CHASSIS TOP VIEW

PROPERTY OF
L. F. BLANKENSHIP
3924 MEADE ST.
DENVER, COLORADO



CHASSIS BOTTOM VIEW-TRANS., INDUCTOR AND ALIGNMENT IDENTIFICATION

TUBES (SYLVANIA, GENERAL ELECTRIC, WESTINGHOUSE)

ITEM No.	USE	REPLACEMENT DATA: AIRLINE PART No.	REPLACEMENT DATA: STANDARD REPLACEMENT	RETMA BASE TYPE	NOTES
V1	UHF Osc.	6AF4A	6AF4A	7DK	6AF4 or 6T4 may be used as an alternate.
V2	RF Amp.	6BZ7	6BZ7	9AJ	6BQ7A may be used as an alternate.
V3	Osc. -Mixer	6U8	6U8	9AE	
V4	1st Video IF Amp.	6CB6	6CB6	7CM	
V5	2nd Video IF Amp.	6CB6	6CB6	7CM	
V6	3rd Video IF Amp.	6CB6	6CB6	7CM	
V7	Video Output	6AH6	6AH6	7BK	
V8	Sound IF Amp.	6AU6	6AU6	7BK	
V9	Ratio Det. - AF Amp. - AGC Clamper	6T8	6T8	9E	
V10	Audio Output	6W6GT	6W6GT	7AC	
V11	Sync Sep.	6AU6	6AU6	7BK	
V12	Sync Phase Inv. - Vert. Osc.	6SN7GTA	6SN7GTA	8BD	6SN7GT may be used as an alternate.
V13	Vert. Output	6S4	6S4	9AC	
V14	Horiz. AFC	6AL5	6AL5	6BT	
V15	Horiz. Mult.	6SN7GTA	6SN7GTA	8BD	6SN7GT may be used as an alternate.
V16	Horiz. Output	6BQ6GT	6BQ6GT	6AM	
V17	Damper	6W4GT	6W4GT	4CG	
V18	HV Rect.	1B3GT	1B3GT	3C	
V19	LV Rect.	5U4G	5U4G	5T	

CATHODE-RAY TUBE

ITEM No.	REPLACEMENT DATA: AIRLINE PART No.	CBS PART No.	GENERAL ELECTRIC PART No.	SYLVANIA PART No.	WESTINGHOUSE PART No.	RETMA BASE TYPE	NOTES
V20	21AUP4A①	21AUP4A①		21AUP4A ②	21AUP4A①	12L	① Aluminized
				21AUP4A/B ②		12L	② Silver Screen
				21AUP4	21AUP4	12L	
	21YP4A ①	21YP4A ①	21YP4A ①	21YP4A ②	21YP4A ①	12L	
		21YP4	21YP4	21YP4	21YP4	12L	
	17HP4	17HP4/17RP4	17RP4/17HP4	17HP4/ 17RP4	17HP4/17RP4	12L	
		17HP4B ①		17HP4B ②		12L	

ELECTROLYTIC CAPACITORS

ITEM No.	RATING: CAP.	RATING: VOLT.	REPLACEMENT DATA: AIRLINE PART No.	REPLACEMENT DATA: MALLORY PART No.	REPLACEMENT DATA: PYRAMID PART No.	REPLACEMENT DATA: SANGAMO PART No.	NOTES
C1A	▲40	400	N-8969	FP247	TM-804020-450	T-180	
B	▲100	400					
C2A	10	400	N-8967	FP453.4	TM-4106	Q-140	
B	▲80	200				FM-4510	
C	■40	200					
D	▲100	50					
C3	16	50	N-6912	TC44	TD-16-150	FM-1516	
C4	100	200	N-8970	FP129.1	TM-100-300	MT-25100	
C5A	■10	450	N-8039	FP231	TM-D10-450	D-200	
B	▲10	450					

FIXED CAPACITORS

Capacity values given in the rating column are in mfd. for Paper Capacitors, and in mmfd. Mica and Ceramic Capacitors.

ITEM No.	RATING: CAP.	RATING: VOLT.	REPLACEMENT DATA: AIRLINE PART No.	REPLACEMENT DATA: CENTRALAB PART No.	REPLACEMENT DATA: ERIE PART No.	REPLACEMENT DATA: MALLORY PART No.	NOTES
C6A	1						
B	2						
C7	800		13M-23E-801Z	MFT-1000			
C8	800		13M-23E-801Z	MFT-1000			
C9	120			DD-121	811-121	UC-5312	
C10	10		13M-20A100DN1				
C11	6.8		13L8C-6R8N	TCZ-6R8	NPOA-6R8	ZT-5568	
C12	.5-3			829-3	3115-01-0R5	CT565A	
C13	1500		13L-8XA-152Z	DD-152	801-0015	DC-5215	
C14	3		13L8C-030H	TCZ-3R3	NPOA-030	ZT-553	
C15	.5-3			829-3	3115-01-0R5	CT565A	
C16	800		13M-23E-801Z	MFT-1000			
C17	47		13L-8Q-470K	DD-470	831-470	UC-5447	
C18	1.5		13L-8C-1R5C	TCZ-1R5	NPOA-1R5	ZT-5515	
C19	47		13M-20U470KR	MFT-50			
C20	.5-3			829-3	3115-01-0R5	CT565A	
C21	.5-3			829-3	3115-01-0R5	CT565A	
C22	5		13L-8UA-050C				
C23	10		13L-8U-100F	TCN-10	N750A-100	NT-541	
C24	1500		13L-8XA-152Z	DD-152	801-0015	DC-5215	
C25	800		13M-23E-801Z	MFT-1000			
C26	220		13L-120-221K	DD-221	811-221	UC-5322	
C27	68		13L-12U-680H	TCN-68	N750L-680		
C28	800		13M-23E-801Z	MFT-1000			
C29	800		13M-23E-801Z	MFT-1000			
C30	1500		13L-8XA-152Z	DD-152	801-0015	DC-5215	
C31	100			D6-101	GP1K-101	UC-531	
C32	5000		N-6272	DD-502	811-005	DC-525	
C33	1000			DD-102	801-001	DC-521	
C34	5000		N-6272	DD-502	811-005	DC-525	
C35	5000		N-6272	DD-502	811-005	DC-525	
C36	1000			DD-102	801-001	DC-521	
C37	5000		N-6272	DD-502	811-005	DC-525	
C38	1000			DD-102	801-001	DC-521	
C39A	4000		N-7774	D6-402	822-004	DCD-524	
B	4000			D6-402			
C40	10			DD-100	831-100	UC-541	
C41	5000		N-6272	DD-502	811-005	DC-525	
C42	.25	200				PT4025	
C43	.25	200				PT4025	
C44	.1	200		DF-104		PT401	
C45	22		N-9049	TCZ-22	NPOK-220		
C46	.1	400		DF-104		PT401	
C47	.02	600		DF-203	817-02	PT612	Note 1
C48	4.7			TCZ-4R7	NPOA-4R7	ZT-5547	
C49	68			TCZ-68	NPO-337-680		
C50	47			TCZ-47	NPO-338-470	ZT-5447	
C51	5000		N-6272	DD-502	811-005	DC-525	
C52	10000		N-9062	DD-103	811-01	DC-511	
C53	560	500	N-7780	D6-561	GP2K-561	UC-5356	
C54	3900		N-9059	D6-402	GP2-333-392	UC-5240	
C55	10000		N-9062	DD-103	811-01	DC-511	
C56	5000		N-6272	DD-503	811-005	DC-525	

CAPACITO

ITEM No.	RATING: CAP.	RATING: VOLT.	REPLACEMENT DAT: AIRLINE PART No.	REPLACEMENT DAT: CENTRALAB PART No.	REPLACEMENT DAT: PA
C57	100			D6-101	GP1
C58	.02	400		DF-203	817-
C59	.05	200		DF-503	
C60	.015	600	N-9046	DD16-153	
C61	5000		N-6272	DD-502	811-0
C62	5000		N-6272	DD-502	811-0
C63	5000		N-6272	DD-502	811-0
C64	220			D6-221	GP2
C65	22		N-9049	TCZ-22	NPO
C66	5000		N-6272	DD-502	811-0
C67A	2000				
B	5000		♦N-8042	♦PC-100	♦140
C	5000				
C68	4700	500	N-6893		
C69	.1	400	N-9623	DF-104	
C70	.1	400		DF-104	
C71	1100	500	N-7783		811-1
C72	1100	500	N-7783		811-1
C73	.0047	600	N-9061	D6-472	GP2-
C74	1000	1000	N-9058	DD-102	1R5K
C75	.01	400		D6-103	GP3-
C76	.05	200		DF-503	
C77	220	500	N-9054	TCZ-220	NPO
C78	.0039	600	N-9060		
C79	330	500	N-9056		
C80	330	500			
C81	230	500			
C82	1100	500	N-7783		811-1
C83	.1	200		DF-104	
C84	.25	400			
C85	.1	200		DF-104	
C86	500	20000	N-8041	TV3-502	413
C87	47	2000		DD30-470	3KV-
C88	.01	600	N-9439	DD-103	GP3-
C89	.01	600	N-9439	DD-103	GP3-

Note 1. Some versions use 5000MMF in this application (Par
Note 2. When C80 is 560MMF (Part No. N-9057), C81 is not
Note 3. Some versions use 43MMF in this application (Part
♦ Items C67A, C67B, C67C, R71A, R71B and R71C are comb

CON

ITEM No.	RATING: RESIST-ANCE	RATING: WATTS	REPLACEMEN: AIRLINE PART No.	REPLACEMEN: CENTRALAB PART No.	REPLACEMEN: CLAROS PART N
R1A	2500Ω	½	N-9777	F1-15	RTV-50
B	500KΩ	½		R2-41	
C	Switch			KB-1	
R2A	100KΩ	½	N-8944	BX-40	A47-100
B	Shaft		Not Req.	Not Req.	FKS-1/4
R3A	1Meg	½	N-8943	BX-69	A47-1Me
B	Shaft		Not Req.	Not Req.	FKS-1/4
R4A	2.5Meg	½	N-8971	BX-83	A47-2.5M
B	Shaft		Not Req.	Not Req.	FKS-1/4
R5A	5000Ω	½	N-8945	BX-10	A47-5000
B	Shaft		Not Req.	Not Req.	FKS-1/4

♦ Concentrikit Equivalent, K-2 Kit, Base Elements And Shafts,

RESIST

ITEM No.	RATING: OHMS	RATING: WATT	REPLACEMENT DATA: AIRLINE PART No.	REPLACEMENT DATA: IRC PART No.	NOTES
R6	10KΩ	½	12TAE-103M		
R7	1000Ω	½	12TAE-102K	BTS-1000	
R8	100Ω	½		BTS-100	
R9	22KΩ	½	12TAE-223K	BTS-22K	
R10	47KΩ	½	12TAE-473K	BTS-47K	
R11	270KΩ	½	12TAE-274K	BTS-270K	
R12	180KΩ	½	12TAE-184K	BTS-180K	
R13	680Ω	½	12TAE-681K	BTS-680	
R14	10KΩ	½	12TAE-103M	BTS-10K	
R15	3300Ω	1	12SAE-332K		
R16	33KΩ	½	12TAE-333M	BTS-33K	
R17	15KΩ	½	12TAE-153K		
R18	100KΩ	½	12TAE-104K	BTS-100K	
R19	100KΩ	½	12TAE-104K	BTS-100K	
R20	100KΩ	½	12TAE-104K	BTS-100K	
R21	8200Ω	½	12TAE-822K		
R22	4700Ω	½	12TAE-472K	BTS-4700	
R23	1000Ω	½		BTS-1000	
R24	1800Ω	1		BTA-1800	
R26	4700Ω	½			
R26	1000Ω	½		BTS-1000	
R27	150Ω	½		BTS-150	
R28	47Ω	½		BTS-47	
R29	18KΩ	½			
R30	1000Ω	½		BTS-1000	
R31	150Ω	½		BTS-150	
R32	47Ω	½		BTS-47	
R33	560Ω	½		BTS-560	
R34	150Ω	½		BTS-150	
R35	820KΩ	½		BTS-820K	
R36	820KΩ	½		BTS-820K	
R37	6800Ω	½		BTS-6800	
R38	4.7Meg	½		BTS-4.7Meg	
R39	560KΩ	½		BTS-4.7Meg	
R40	3900Ω	2		BTB-3900	
R41	33KΩ	1		BTA-33K	Note 1
R42	47Ω	½		BTS-47	Note 2
R43	470KΩ	½		BTS-470K	Note 3
R44	1Meg	½		BTS-1Meg	
R45	100KΩ	½		BTS-100K	Note 3
R46	150KΩ	½		BTS-150KΩ	
R47	1000Ω	½		BTS-1000Ω	
R48	39KΩ	1		BTA-39KΩ	
R49	390Ω	½		BTS-390	
R50	15KΩ	½		BTS-15K	
R51	330Ω	½		BTS-330	

PARTS LIST AND DESCRIPTIONS

TUBES (SYLVANIA, GENERAL ELECTRIC, WESTINGHOUSE)

ITEM No.	USE	REPLACEMENT DATA: AIRLINE PART No.	REPLACEMENT DATA: STANDARD REPLACEMENT	RETMA BASE TYPE	NOTES
V1	UHF Osc.	6AF4A	6AF4A	7DK	6AF4 or 6T4 may be used as an alternate.
V2	RF Amp.	6BZ7	6BZ7	9AJ	6BQ7A may be used as an alternate.
V3	Osc.-Mixer	6U8	6U8	9AE	
V4	1st Video IF Amp.	6CB6	6CB6	7CM	
V5	2nd Video IF Amp.	6CB6	6CB6	7CM	
V6	3rd Video IF Amp.	6CB6	6CB6	7CM	
V7	Video Output	6AH6	6AH6	7BK	
V8	Sound IF Amp.	6AU6	6AU6	7BK	
V9	Ratio Det.- AF Amp.- AGC Clamper	6T8	6T8	9E	
V10	Audio Output	6W6GT	6W6GT	7AC	
V11	Sync Sep.	6AU8	6AU8	7BK	
V13	Sync Phase Inv. - Vert. Osc.	6SN7GTA	6SN7GTA	8BD	6SN7GT may be used as an alternate.
V13	Vert. Output	6S4	6S4	8AC	
V14	Horiz. AFC	6AL5	6AL5	6BT	
V15	Horiz. Mult.	6SN7GTA	6SN7GTA	8BD	6SN7GT may be used as an alternate.
V16	Horiz. Output	6BQ6GT	6BQ6GT	8AM	
V17	Damper	6W4GT	6W4GT	4CG	
V18	HV Rect.	1B3GT	1B3GT	5C	
V19	LV Rect.	5U4G	5U4G	5T	

CATHODE-RAY TUBE

ITEM No.	REPLACEMENT DATA: AIRLINE PART No.	C85 PART No.	GENERAL ELECTRIC PART No.	SYLVANIA PART No.	WESTINGHOUSE PART No.	RETMA BASE TYPE	NOTES
V20	21AUP4A①	21AUP4A①		21AUP4A ② 21AUP4A/B ②	21AUP4A①	12L	① Aluminized ② Silver Screen
				21AUP4	21AUP4	12L	
	21YP4A ①	21YP4A ①	21YP4A ①	21YP4A ③	21YP4A ①	12L	
		21YP4	21YP4	21YP4	21YP4	12L	
	17HP4	17HP4/17HP4	17HP4/17HP4	17HP4/ 17HP4/17HP4	17HP4/17HP4	12L	
				17HP4			
	17HP4B ③			17HP4B ③		12L	

ELECTROLYTIC CAPACITORS

ITEM No.	RATING: CAP.	RATING: VOLT.	REPLACEMENT DATA: AIRLINE PART No.	REPLACEMENT DATA: MALLORY PART No.	REPLACEMENT DATA: PYRAMID PART No.	REPLACEMENT DATA: SANGAMO PART No.	NOTES
C1A	≈40	400	N-8969	FP247	TM-B4020- 888	T-180	
B	≈100	400					
C2A	10	400	N-8967	FP453.4	TM-4106	Q-149	
B	≈80	300				FM-4510	
C	≈40	300					
D	≈100	50					
C3	16	50	N-8913	TC44	TD-16-150	FM-1516	
C4	100	200	N-8970	FP128.1	TM-100-300	MT-10500	
C5A	≈10	450	N-8939	FP531	TM-D10-450	D-200	
B	≈10	450					

FIXED CAPACITORS

Capacity values given in the rating column are in mfd. for Paper Capacitors, and in mmfd. Mica and Ceramic Capacitors.

ITEM No.	RATING: CAP	RATING: VOLT.	REPLACEMENT DATA: AIRLINE PART No.	REPLACEMENT DATA: CENTRALAB PART No.	REPLACEMENT DATA: ERIE PART No.	REPLACEMENT DATA: MALLORY PART No	NOTES
C4A	1						
B	2						
C7	800		13M-32E-80LZ	MFT-1000			
C8	800		13M-23S-80LZ	MFT-1000			
C9	120			DD-121	31S-121	UC-5S12	
C10	10		13M-20A10DDN1				
C11	6.8		13L8C-6R8N	TCZ-6R8	NPOA-6R8	TZ-5S68	
C12	5.6			22S-3	31S-01-5R6	CT565A	
C13	1500		15L-S5A-152Z	DD-152	80L-0015	DC-5215	
C14	3		13L8C-030Z	TCZ-3R3	NPOA-030	TZ-553	
C15	5.6			22S-3	31S-01-0R5	CT565A	
C16	800		13M-23S-80LZ	MFT-1000			
C17	47		13L-2Q-470JK	DD-470	83L-470	UC-5447	
C18	1.5		13L-8C-1R5Z	TCZ-1R5	NPOA-1R5	TZ-5S15	
C19	47		13M-20A470KR	MFT-50			
C20	5.6			22S-3	31S-01-0R5	CT565A	
C21	5.6			22S-3	31S-01-0R5	CT565A	
C23	5		13L-91A-050C				
C23	10		13L-5U-100F	TCN-10	N750A-100	NT-541	
C24	1500		13L-S2A-152Z	DD-152	80L-0015	DC-5215	
C25	800		13M-23E-80LZ	MFT-1000			
C26	220		13L-12G-221K	DD-221	81L-221	UC-5322	
C27	68		13L-12U-680M	TCN-68	N750L-680		
C28	800		13M-23E-80LZ	MFT-1000			
C29	800		13M-23E-80LZ	MFT-1000			
C30	1500		13L-S2A-152Z	DD-152	80L-0015	DC-5215	
C31	100			DD-101	GPK-101	UC-531	
C32	5000		N-8272	DD-502	81L-005	DC-525	
C33	1000			DD-102	80L-001	DC-521	
C34	5000		N-8272	DD-502	81L-005	DC-525	
C35	5000		N-8272	DD-502	81L-005	DC-525	
C36	1000			DD-102	80L-001	DC-521	
C37	5000		N-8272	DD-502	81L-005	DC-525	
C38	1000			DD-102	80L-001	DC-521	
C39A	4000		N-7774	DE-402	S22-004	DCD-524	
B	4000			DE-402			
C40	10			DD-100	S2L-100	UC-541	
C41	5000		N-8272	DD-502	81L-005	DC-525	
C42	.25	200				PT4025	
C43	.25	200				PT4025	
C44	.1	200				PT401	
C45	22		N-9040	TCZ-22	NPOK-220		
C46	.1	400		DF-104		PT401	
C47	.02	600		DF-203	81T-02	PT403	Note 1
C48	4.7			TCZ-4R7	NPOA-4R7	TZ-5547	
C49	56			TCZ-56	NPO-337-56Z		
C50	47			TCZ-47	NPO-338-470	TZ-5447	
C51	5000		N-8272	DD-502	81L-005	DC-525	
C52	10000		N-8963	DD-103	81L-01	DC-511	
C53	560	500	N-7780	DE-561	GPZK-56L	UC-5356	
C54	3300		N-9098	DE-332	GPZ-333-332	UC-5349	
C55	10000		N-9262	DD-103	81L-01	DC-511	
C56	5000		N-8272	DD-502	81L-005	DC-525	

ITEM No	RATING: CAP	RATING: VOLT.	REPLACEMENT DATA: AIRLINE PART No.	REPLACEMENT DATA: CENTRALAB PART No.	REPLACEMENT DATA: ERIE PART No.	REPLACEMENT DATA: MALLORY PART No	NOTES
C57	100			DE-101	GPIK-101	UC-531	
C58	.02	400		DF-203	81T-03	PT403	
C59	.005	300		DF-503		PT405	
C60	.015	600	N-9046	DE16-153		PT6015	
C61	500		N-8272	DD-502	81L-005	DC-525	
C62	5000		N-8272	DD-502	81L-005	DC-525	
C63	5000		N-8272	DD-502	81L-005	DC-525	
C64	330			DE-331	GPIK-221	UC-5322	
C65	22		N-9040	TCZ-22	NPOK-220		
C66	5000		N-8272	DD-502	81L-005	DC-525	
C67A	2000					DC-522	
B	5000		⌖N-8042	⌖PC-100	⌖1405-01	DC-525	
C	5000					DC-525	
C68	4700	500	N-8893			MCE455	
C69	.1	400	N-9053	DF-104		PT401	
C70	.1	400		DF-104		PT401	
C71	100	500	N-7783		81L-102	MCB255	
C72	100	500	N-7783		81L-102	MCB255	
C73	.0047	500	N-9061	DE-472	GPB-333-472	PT6247	
C74	1000	1000	N-9058	DD-102	1NE5Y-102	MCK210	
C75	.01	600		DE-103	GPB-333-103	PT411	
C76	.05	200		DF-503		PT405	
C77	220	500	N-9054	TCZ-220	NPO-335-221	MCE240	
C78	.0039	600	N-9060			MCK463	
C79	330	500	N-9056				Note 2
C80	330	500					Note 2
C81	250	500					
C82	100	500	N-7783		81L-103	MCB255	
C83	.1	200		DF-104		PT401	
C84	.25	400				PT4025	
C85	.1	200		DF-104		PT401	
C86	500	20000	N-8041	TV3-502	413	HV20035A	
C87	47	3000		DD30-470	1KSV-470	MCK9447	Note 3
C88	.01	600	N-9439	DD-103	GPB-333-103	PT811	
C89	.01	600	N-9439	DD-103	GPB-333-103	PT811	

Note 1. Some versions use 5000MMF in this application (Part No. N-8272).
Note 2. When C80 is 560MMF (Part No. N-9057), C81 is not used.
Note 3. Some versions use 43MMF in this application (Part No. N-9052).
⌖ Items C67A, C67B, C67C, R71A, R71B and R71C are combined in one unit.

CONTROLS

ITEM No	RATING: RESISTANCE	RATING: WATTS	REPLACEMENT DATA: AIRLINE PART No.	REPLACEMENT DATA: CENTRALAB PART No.	REPLACEMENT DATA: CLAROSTAT PART No.	REPLACEMENT DATA: IRC PART No.	REPLACEMENT DATA: MALLORY PART No.	INSTALLATION NOTES
R1A	250Ω		N-9777	PT-15	RTV-500	QJ-8S1e	UP25ER	Contrast (Panel)
B	500KΩ			R2-41			UR25A	Volume (Rear)
C	Switch			KB-1			US-28	Attach to R1B.
R2A	100KΩ		N-8944	EX-40	A47-100K-S	Q1L-128	SU-41	Brightness
B	Shaft		Not Req.	Not Req.	FKS-1/4	Not Req.	Not Req.	Attach to R2A.
R3A	1Meg		N-8943	EX-39	A47-1Meg-S	Q1L-137	SU-54	Vertical Hold
B	Shaft		Not Req.	Not Req.	FKS-1/4	Not Req.	Not Req.	Attach to R3A.
R4A	2.5Meg		N-8971	EX-83	A47-2.5Meg-S	Q1L-239	SU-565	Height
B	Shaft		Not Req.	Not Req.	FKS-1/4	Not Req.	Not Req.	Attach to R4A.
R5A	5000Ω		N-8945	EX-41	A47-5000-S	Q1L-141	SU-16	Vertical Linearity
B	Shaft		Not Req.	Not Req.	FKS-1/4	Not Req.	Not Req.	Attach to R5A.

⌖ Concentrikit Equivalent, K-2 Kit, Base Elements And Shafts, B17-1H, P1-123 (Panel)
S13-133, S9-324 (Rear)
76-1 Switch

RESISTORS

ITEM No.	RATING: OHMS	RATING: WATT	REPLACEMENT DATA: AIRLINE PART No.	REPLACEMENT DATA: IRC PART No.	NOTES
R6	10KΩ	½	12TAR-103M		
R7	1000Ω ⌖	½	12TAR-102K	BTS-1000	
R8	100Ω	½		BTS-100	
R9	22KΩ	½	12TAR-223K	BTS-22K	
R10	47KΩ	½	12TAR-473K	BTS-47K	
R11	270KΩ	½	12TAR-274K	BTS-270K	
R12	180KΩ	½	12TAR-184K	BTS-180K	
R13	680Ω	½	12TAR-681K	BTS-680	
R14	10KΩ	½	12TAR-103M	BTS-10K	
R15	3300Ω	1	12SAR-332K		
R16	330KΩ	½	12TAR-334M	BTS-33K	
R17	15KΩ	½	12TAR-153K		
R18	100KΩ	½	12TAR-104K	BTS-100K	
R19	100KΩ	½	12TAR-104K	BTS-100K	
R20	100KΩ	½	12TAR-104K	BTS-100K	
R21	680KΩ	½	12TAR-684K		
R22	470KΩ	½	12TAR-474K	BTS-470K	
R23	1000Ω	1		BTS-1000	
R24	1800Ω	1		BTA-1800	
R25	4700Ω	1			
R26	1000Ω	1		BTS-1000	
R27	150Ω	½		BTS-150	
R28	47Ω	½		BTS-47	
R29	15KΩ	½			
R30	1000Ω	½		BTS-1000	
R31	150Ω	½		BTS-150	
R32	47Ω	½		BTS-47	
R33	560Ω	½		BTS-560	
R34	150Ω	½		BTS-150	
R35	6200Ω	½		BTS-620K	
R36	3300Ω	½		BTS-330K	
R37	6800Ω	½		BTS-6800	
R38	4.7Meg	½		BTS-4.7Meg	
R39	5600Ω	½		BTS-4.7Meg	
R40	3900Ω	2		BTB-3900	
R41	33KΩ	1		BTA-33K	Note 1
R42	47Ω	½		BTS-47	Note 2
R43	470KΩ	½		BTS-470K	Note 3
R44	1Meg	½		BTS-1Meg	
R45	100KΩ	½		BTS-100K	Note 3
R46	150KΩ	½		BTS-150K	
R47	1000Ω	½		BTS-1000	
R48	33KΩ	1		BTA-33K	
R49	390Ω	½		BTS-390	
R50	15KΩ	½		BTS-15K	
R51	33KΩ	½		BTS-330	

ITEM No.	RATING: OHMS	RATING: WATT	REPLACEMENT DATA: AIRLINE PART No.	REPLACEMENT DATA: IRC PART No.	NOTES
R52	12KΩ	½		BTS-12K	
R53	6.8Meg	½		BTS-6.8Meg	
R54	220KΩ	½		BTS-220K	
R55	100KΩ 5%	½		BTS-100K 5%	
R56	220KΩ 5%	½	N-9041	BTS-220K 5%	
R57	180KΩ 5%	½	N-7401	BTS-180K 5%	
R58	15KΩ	½		BTS-15K	
R59	220Ω	½		BTS-220	
R60	10KΩ	½		BTS-10K	
R61	560KΩ	½		BTS-560K	
R62	560KΩ	½		BTS-560K	
R63	220KΩ	½		BTS-220K	
R64	15KΩ	½		BTS-15K	
R65	8.2Meg	½	N-9810	BTS-8.2Meg	
R66	47KΩ	½		BTS-47K	
R67	10KΩ	½		BTS-10K	
R68	4700Ω	½		BTS-4700	
R69	3300Ω	½		BTS-3300	
R70	1200Ω	½		BTS-1200	
R71A	22KΩ	½	⌖N-8042	BTS-22K	
B	3300Ω	½		BTS-3300	
C	8200Ω	½		BTS-8200	
R72	1Meg 5%	½		BTS-1Meg	
R73	15KΩ	½		BTS-15K	
R74	390KΩ	½		BTS-390K	
R75	2700Ω	½		BTS-2700	
R76	1500Ω	½		BTS-1500	
R77	2.2Meg	½		BTS-2.2Meg	
R78	220Ω	1		BTA-220	
R79	56KΩ	½		BTS-56K	
R80	3700Ω	½		BTS-3700	
R81	10KΩ	½		BTS-10K	
R82	56Ω	½			
R83	56Ω	½			
R84	100KΩ	½			
R85	100KΩ	½			
R86	100KΩ	½			
R87	4.7Meg	½			
R88	150KΩ	½			
R89	150KΩ	½			
R90	470KΩ	½			
R91	560Ω	½			
R92	180KΩ	½			
R93	82KΩ	½			
R94	8200Ω	½			
R95	820Ω	½		BTS-820	

RESISTORS (cont)

ITEM No.	RATING: OHMS	RATING: WATT	REPLACEMENT DATA: AIRLINE PART No.	REPLACEMENT DATA: IRC PART No.	NOTES
R96	390KΩ	½			
R97	100Ω	½			
R98	560Ω	1			
R99	4.3Ω	1	N-8125		
R100	470KΩ	1		BTA-470K	
R101	470KΩ	½		BTS-470K	
R102	270KΩ	½		BTS-270K	

Note 1. Some versions use a 39KΩ 1W resistor in this application.
Note 2. Note used in some versions.
Note 3. Some versions use a 220KΩ ½W resistor in this application.
⌖ Items C67A, C67B, C67C, R71A, R71B, R71C are combined in one unit.

TRANSFORMER (POWER)

ITEM No.	RATING: PRI	RATING: SEC 1	RATING: SEC 2	REPLACEMENT DATA: AIRLINE PART No.	Halldorson PART No	Merit PART No	RCA TYPE No	Stancor PART No	Thordarson PART No	Triad PART No
T1	117VAC	356VCT @ 1.4A	5VAC @ 3A	N-8935						
		.180ADC								
	SEC 3	SEC 4	SEC 5							
	6.3VAC @ 1.2A	6.3VAC @ 1.35A	6.3VAC @ 7A							

TRANSFORMERS (SWEEP CIRCUITS)

ITEM No.	USE	REPLACEMENT DATA: AIRLINE PART No.	Halldorson PART No	Merit PART No	RCA TYPE No	Ram PART No	Stancor PART No	Thordarson PART No	Triad PART No
T2	Vert. Osc. Trans.	N-9002	B8702 ①	A-3003 ①	20V11 ①	V405 ①	A-8125 ①	26A05 ①	A-97X ①
T3	Horiz. Output Trans.	N-8938	P3412*	HVO-49*	2327A ①	XU1*		FLY-39 ①	D-35 & WC-12*
T4	Vert. Output Trans.	N-8937	Z1900 ①	A-3081 ①	212RI*	V306 ①	A-8140 ①	26S57 ①	A-110X ①
T5A	Yoke Horiz. (24MM)	N-8930	DF603 ②	MDF-74 ②	Z14DI ②	DY-10A ②	Y10F25/3 ②	DY-11 ②	Y-20-1 ②
	Vert. (24MM)								

① Drill new mounting hole(s).
② Connect as auto transformer.
③ Use 50 to 1 turns ratio.
④ Use original yoke damping network.

*HORIZONTAL OUTPUT TRANSFORMER CONNECTION DATA

Use Original Width Coil Unless Replacement Type Is Listed

	ORIGINAL TERMINAL (CONNECTION)	Halldorson Replacement Connections	Merit Replacement Connections	RCA Replacement Connections	Ram Replacement Connections	Stancor Replacement Connections	Thordarson Replacement Connections	Triad Replacement Connections
B	Horiz.Out. Plate Lead	Horiz.Out. Plate Lead	Horiz. Out. Plate Lead	10	8		Horiz. Out. Plate Lead	10
	3	4	4	6 or 7	4		4	6 or 7
	2	3	3	5	2		3	5
	1	1	1	1	1		1	1
	Connect Width Coil Across			212RI across 2 & 4				WC-12 Blue & Red Term Across 2 & 4
	Special Notes		⑤					⑤

⑤ Jumper terminals #2 & #3.
⑥ Jumper terminals #9 & #7.

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	IMPEDANCE: PRI	IMPEDANCE: SEC	AIRLINE PART No.	Halldorson PART No.	Merit PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.	NOTES
T6	5.2KΩ	3.4Ω	N-8938	21005	A-3018 ①	A-3848 ①	26S50 ①	S-1X	① Drill one new mtg. hole.

SPEAKER

ITEM No.	RATINGS: SIZE	FIELD	V. C. IMP	REPLACEMENT DATA: AIRLINE PART No.	QUAM PART No.	NOTES
SP1	5"	88Ω	3.4Ω	N-9184	5K88S	

COILS (RF-IF)

ITEM No.	USE	DC RES.: PRI.	DC RES.: SEC.	AIRLINE PART No.	MEISSNER PART No.	MERIT PART No.	MILLER PART No.	NOTES
L1	UHF IF Coil	0Ω						
L2	UHF IF Coil	0Ω						
L3	UHF Ant. RF, Mixer and Osc. Coils	0Ω						
L4	UHF IF Coil	0Ω						
L5A	Fil. Choke	0Ω						
B	Fil. Choke	0Ω						
L6	Cathode Choke	0Ω						
L7	RF Coil	0Ω						
L8	RF Choke	0Ω						
L9	VHF Ant. Coils	00CT	0Ω					
L10	UHF IF Coil	0Ω	.3Ω					
L11	Mixer. Coil	0Ω						
L12	VHF RF, Mixer Grid, Osc. Coils	0Ω						
L13	UHF IF Coil	0Ω	.3Ω					
L14	UHF IF Coil	.3Ω						
L15	Fil. Choke	0Ω						
L16	Conv. Plate	.1Ω						
L17	Fil. Choke	0Ω			19-1001		4694	L 4 Microhenries
L18	RF Coil	0Ω			19-1001		4694	L 4 Microhenries Note 1
L19	1st Video IF	0Ω	3.1Ω	N-9904				
L20	Fil. Choke	0Ω		N-9907	19-1005		4694	L 4 Microhenries
L21	2nd Video IF	.1Ω	.1Ω	N-9905	17-4623	TV-105	6219	
L22	Fil. Choke	0Ω		N-9823	19-1001		4694	L 4 Microhenries
L23	3rd Video IF	.1Ω	.1Ω	N-9905	17-4623	TV-105	6219	
L24	Fil. Choke	0Ω		N-9907	19-1001		4694	L 4 Microhenries
L25	Series Peaking Coil	4.2Ω		N-8932				48 Microhenries

F. BLANKENSHIP

PARTS LIST AND DESCRIPTIONS (Continued)

COILS (cont)

ITEM No.	USE	DC RES.		REPLACEMENT DATA				NOTES
		PRI.	SEC.	AIRLINE PART No.	MEISSNER PART No.	MERIT PART No.	MILLER PART No.	
L26	Shunt Peaking Coil	16Ω		N-9250	19-3500		6138	464 Microhenries
L27	Series Peaking Coil	13Ω		N-8933	19-3500*		6155*	294 Microhenries, wound on 8.2KΩ resistor
L28	4.5MC Trap	3.6Ω		N-9011	20-1004	TV-151	1470	
L29	Shunt Peaking Coil	16Ω		N-8934	19-3500■		6174■	500 Microhenries, wound on 6.8K resistor
L30	Sound IF	1.2Ω		N-7746	17-3400	TV-151	1469	
L31	Ratio Det.	8.5Ω	.7ΩCT	N-8928	17-1033▲	TV-110▲	1468▲	Tertiary winding=.5Ω
L32	Horiz. Osc.	58Ω		N-8931	19-1576	TV-163	6210	

Note 1. Not used in some versions.
* Parallel with 8.2KΩ resistor.
■ Parallel with 6.8KΩ resistor.
▲ Drill mounting holes.

FUSES

ITEM No.	TYPE	RATING	REPLACEMENT DATA					
			PART No.		LITTELFUSE PART No.		BUSS PART No.	
			FUSE	HOLDER	FUSE	HOLDER	FUSE	HOLDER
M1	3AG	3/8A 250V	N-9660	N-9007	312.375 (3AG 3/8A)	357001	AGC 3/8	4405

CRYSTAL DIODES

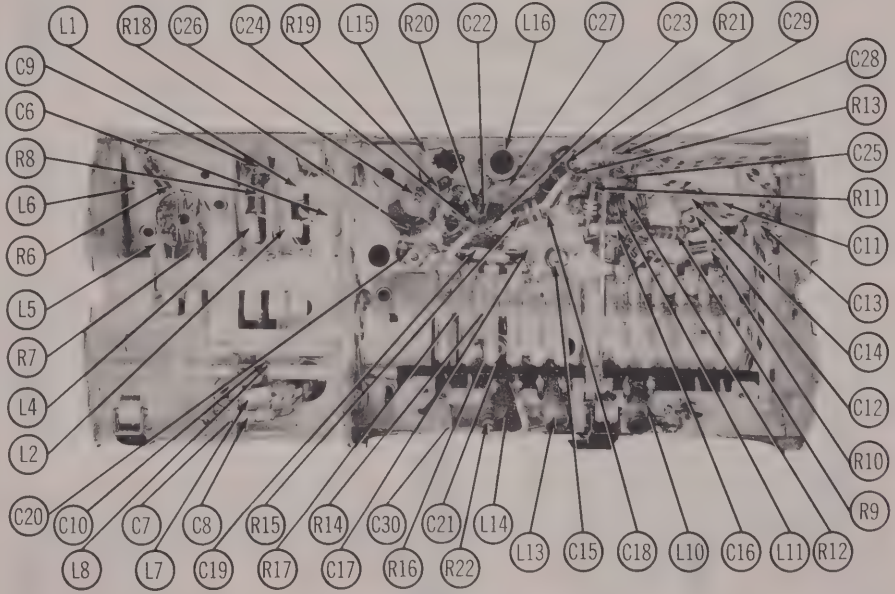
ITEM No.	ORIG. TYPE	REPLACEMENT DATA		NOTES
		AIRLINE PART No.	SYLVANIA PART No.	
M2	1N82A*	31K-111	1N82A	UHF Mixer
M3	1N64	1N64	1N60 or 1N132	Video Det.
M4	1N64	1N64	1N60 or 1N132	AGC Rectifier

* Some versions may use crystal diode type 1N82 in this application.

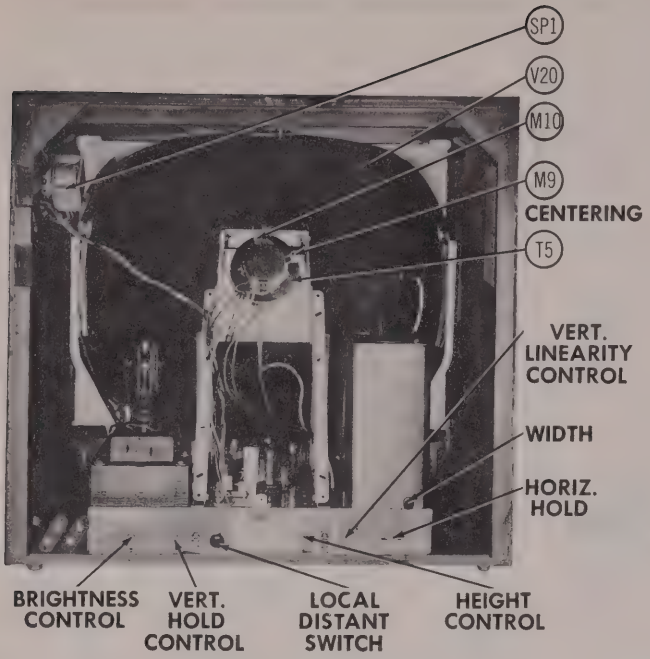
MISCELLANEOUS

ITEM No.	PART NAME	AIRLINE PART No.	NOTES
M5	Tuner	TV5519	VHF-UHF
M6	Trap	31K-225	VHF Ant. Input Filter
M7	Video Det. Assy.	N-9806	Includes M3, M4, IF Coil (Part #N-9826), Series Peaking Coil (Part #N-9831) C40, 5MMF Capacitors(Part #9830), 1Meg Resistor (Part #N-2976), & 820KΩ Resistor (Part #N-4469)
M8	Switch	N-9808*	Local-Distant (2 Pole-3Position-Rotary-Wafer Type)
M9	Centering Device	N-8939	
M10	Ion Trap	N-9012	
	Cabinet	507HF	
	Knob	N-9816	Fine Tuning
	Knob	N-9814	VHF Channel Selector
	Knob	N-9817	On-Off-Volume
	Knob	N-9819	AGC Switch
	Knob	N-9818	Contrast
	Knob	N-9815	UHF Channel Selector
	Safety Glass	R-1194	Models GSL4102A, GSL4102B
	Safety Glass	N-9464	Model GSL4102C
	Safety Glass	R-1565	Model GSL4116A
	Mask	R-1192	

* Alternate Part #N-9823.



RF TUNER-BOTTOM VIEW



CABINET—REAR VIEW

HORIZONTAL SWEEP CIRCUIT ADJUSTMENTS

Turn the set on and tune in a TV station, preferably a test pattern.

Adjust the horizontal hold control (located on rear panel of receiver) until the picture falls in sync. Remove the signal by switching off channel, then back again. If receiver fails to hold sync readjust the horizontal hold control.

Set the horizontal size adjustment control for a picture slightly wider than necessary to fill the picture mask horizontally.

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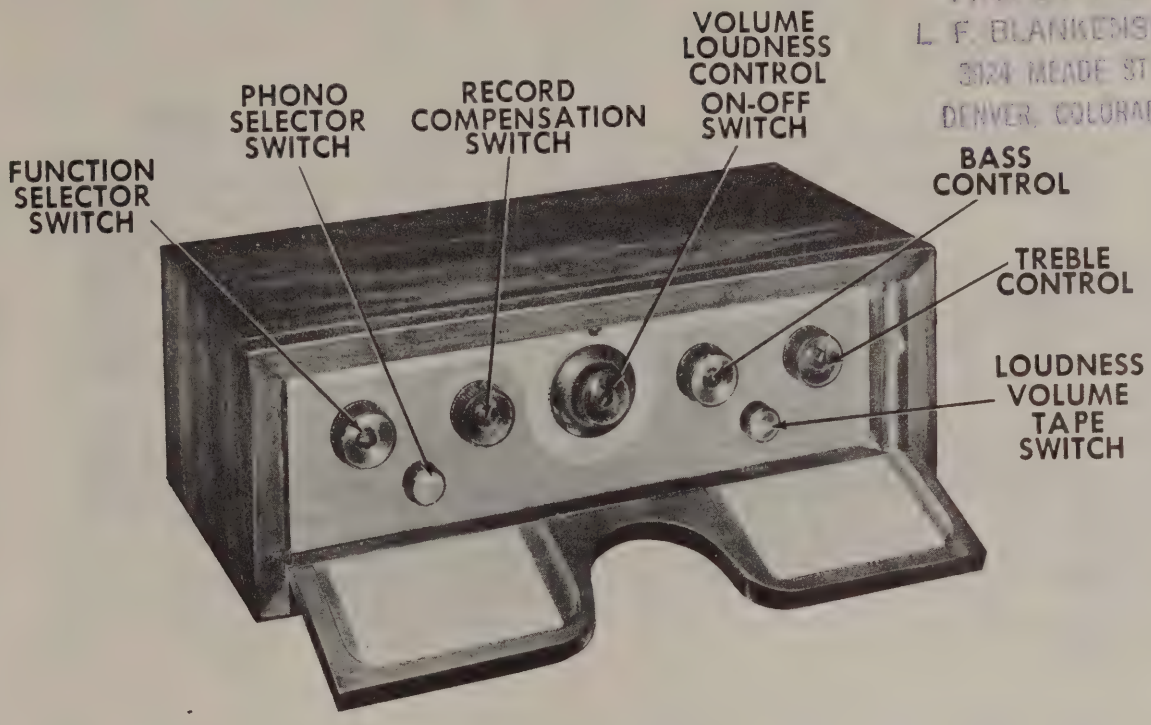
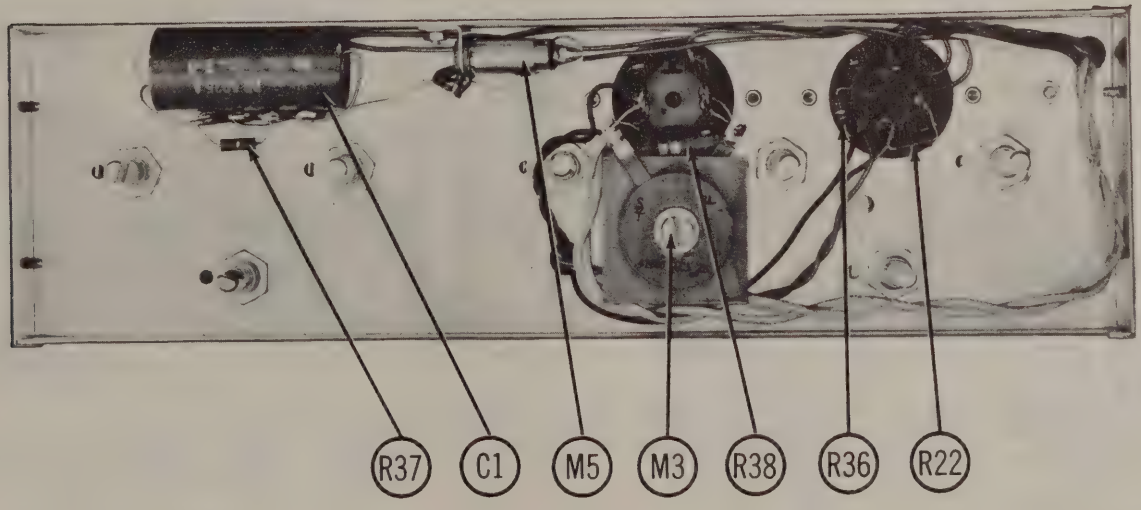


ALTEC LANSING
MODEL A-440A

TRADE NAME	Altec Lansing Model A-440A
MANUFACTURER	Altec Lansing Corp., 9356 Santa Monica Blvd., Beverly Hills, Calif.
TYPE SET	AC Operated 5 Channel Audio Preamplifier-Equalizer
TUBES (Three	Types: 12AY7 Preamp., 12AY7 AF Amp., 12AU7 Cathode Follower
POWER SUPPLY	110-120 Volts AC-60 Cycles RATING .12 Amp. @ 117 Volts AC



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PARTS LIST AND DESCRIPTIONS

ALTEC LANSING
Model A-440A

TUBES (SYLVANIA, GENERAL ELECTRIC, WESTINGHOUSE)

ITEM No.	USE	REPLACEMENT DATA: Altec-Lansing PART No.	REPLACEMENT DATA: STANDARD REPLACEMENT	RETMA BASE TYPE	NOTES
V1	Phono Preamp.	12AY7	12AY7	9A	
V2	AF Amplifier	12AY7	12AY7	9A	
V3	Cathode Follower	12AU7	12AU7	9A	

ELECTROLYTIC CAPACITORS

ITEM No.	RATING: CAP.	RATING: VOLT.	REPLACEMENT DATA: Altec-Lansing PART No.	MALLORY PART No.	PYRAMID PART No.	SANGAMO PART No.	NOTES
C1	40	250		TC58	TD-40-250	FM-2540	
C2A	▲40	300		FP420	TM-4042	T-165	
B	■40	300				MT-4520	
C	▲20	300					
D	10	300					
C3	50	3		TC29	TD-50-6	MMT-350	
C4	50	3		TC29	TD-50-6	MMT-350	
C5A	▲1000	15		WP200		D-015	
B	▬1000	15					

FIXED CAPACITORS

Capacity values given in the rating column are in mfd. for Paper Capacitors, and in mmfd. Mica and Ceramic Capacitors.

ITEM No.	RATING: CAP.	RATING: VOLT.	REPLACEMENT DATA: Altec Lansing PART No.	CENTRALAB PART No.	ERIE PART No.	MALLORY PART No.	NOTES
C6	1500				811-152		
C7	1000				811-102		
C8	500			D6-501	811-501		
C9	250			D6-251	811-251		
C10	6800			D6-682			
C11	4000	500				MC463	
C12	5000			DD-502	811-005	DC-525	
C13	.047	400		DF-503		PT4147	
C14A	200		♦11899				
B	100						
C	4500						
D	4500						
C15	.05	400		DF-503		PT415	
C16	10000			DD-103	811-01	DC-511	
C17	330				811-331		
C18	3300			D6-332	GP2-333-332	UC-5233	
C19	500			D6-501	811-501		
C20	5000			D6-502	GP2-333-502	UC-525	
C21	.25	400				PT4025	
C22	.1	400		DF-104		PT401	
C23	1000			D6-102	GP2L-102	UC-521	
C24	.1	400		DF-104		PT401	

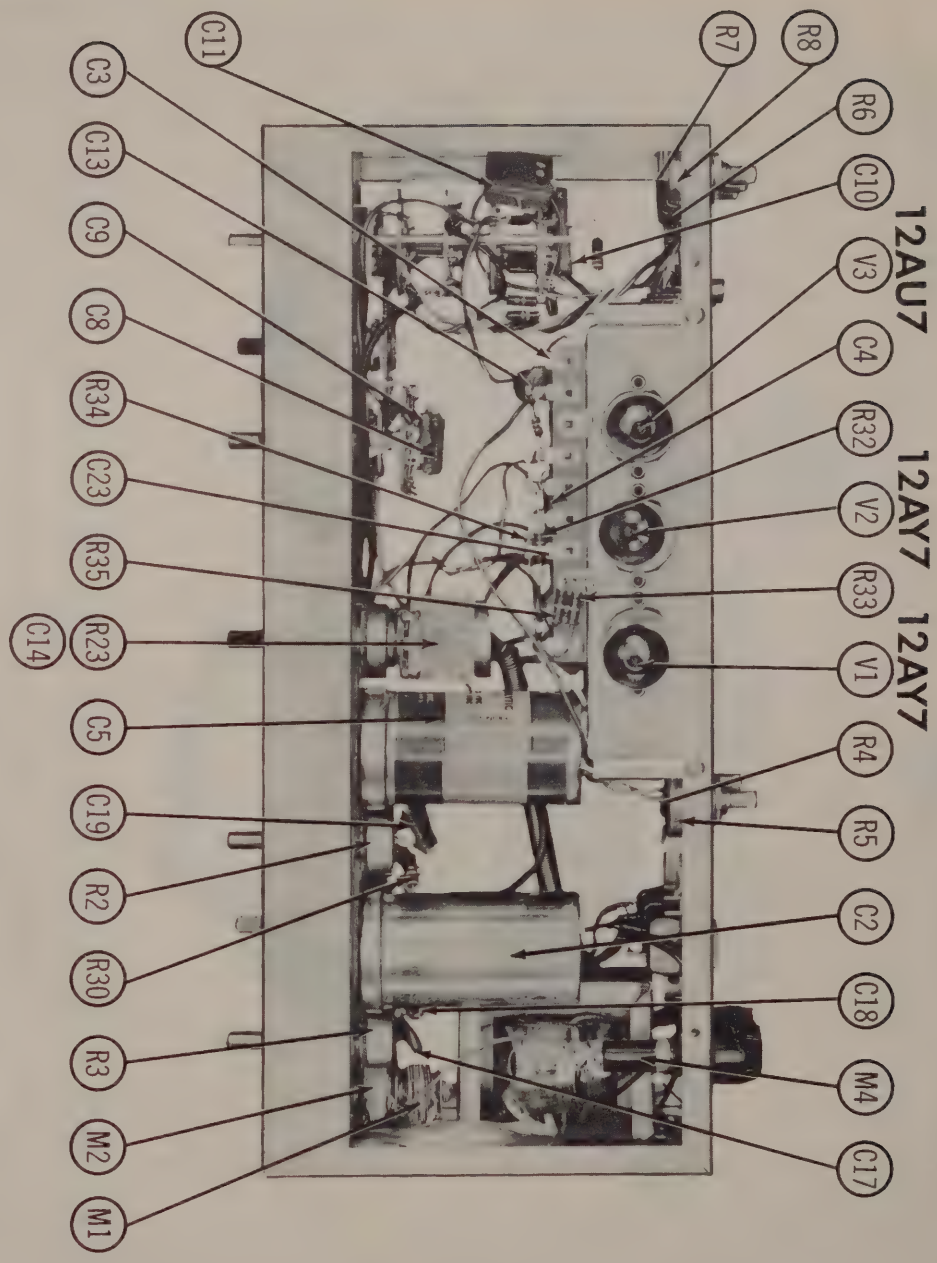
♦ C14A, C14B, C14C, C14D, R23A , R23B, R1A and R1B are combined in one unit. (Part #11899).

CONTROLS

ITEM No.	RATING: RESISTANCE	RATING: WATTS	REPLACEMENT DATA: Altec-Lansing PART No.	CENTRALAB PART No.	CLAROSTAT PART No.	IRC PART No.	MALLORY PART No.	INSTALLATION NOTES
R1A	500KΩ	½	♦11899					Volume (Panel)
B	500KΩ	½						Loudness & switch (Rear)
R2A	1Meg	½	11900	B-70	A47-1Meg-Z	Q13-137	U-53	Bass
B	Shaft		Not Req.	Not Req.	FS-3	Not Req.	Not Req.	Attach to R2A
R3A	1Meg	½	11900	B-70	A47-1Meg-Z	Q13-137	U-53	Treble
B	Shaft		Not Req.	Not Req.	FS-3	Not Req.	Not Req.	Attach to R3A
R4A	200KΩ	½		AB-51	A47-250K-Z	Q13-130	U-44	Phono #1 level
B	Shaft			AK-1	FKS-1/4	Not Req.	Not Req.	Attach to R4A
R5A	200KΩ	½		AB-51	A47-250K-Z	Q13-130	U-44	Phono #2 Level
B	Shaft			AK-1	FKS-1/4	Not Req.	Not Req.	Attach to R5A
R6A	200KΩ	½		AB-51	A47-250K-Z	Q13-130	U-44	TV level
B	Shaft			AK-1	FKS-1/4	Not Req.	Not Req.	Attach to R6A
R7A	200KΩ	½		AB-51	A47-250K-Z	Q13-130	U-44	Tape level
B	Shaft			AK-1	FKS-1/4	Not Req.	Not Req.	Attach to R7A
R8A	200KΩ	½		AB-51	A47-250K-Z	Q13-130	U-44	Receiver level
B	Shaft			AK-1	FKS-1/4	Not Req.	Not Req.	Attach to R8A

♦ Items C14A, C14B, C14C, C14D, R23A, R23B, R1A and R1B are combined in one unit. (Part #11899).

CHASSIS—TOP VIEW



PARTS LIST AND DESCRIPTIONS (Continued)

RESISTORS

ITEM No.	RATING		REPLACEMENT DATA		NOTES
	OHMS	WATT	Altec Lansing PART No.	IRC PART No.	
R9	47KΩ	½		BTS-47K	
R10	240KΩ 5%	½		BTS-240K 5%	
R11	1800Ω	½		BTS-1800	
R12	1Meg	½		BTS-1Meg	
R13	240KΩ 5%	½		BTS-240K 5%	
R14	1800Ω	½		BTS-1800	
R15	1Meg	½		BTS-1Meg	
R16	330KΩ	½		BTS-330K	
R17	150KΩ	½		BTS-150K	
R18	75KΩ 5%	½		BTS-75K 5%	
R19	75KΩ 5%	½		BTS-75K 5%	
R20	100KΩ	½		BTS-100K	
R21	68KΩ	½		BTS-68K	
R22	22KΩ	½		BTS-22K	
R23A	50KΩ	½	♦11899	BTS-56K	
B	50KΩ			BTS-56K	

ITEM No.	RATING		REPLACEMENT DATA		NOTES
	OHMS	WATT	Altec Lansing PART No.	IRC PART No.	
R24	240KΩ 5%	½		BTS-240K 5%	
R25	1800Ω	½		BTS-1800	
R26	1Meg	½		BTS-1Meg	
R27	240KΩ5%	½		BTS-240K 5%	
R28	1800Ω	½		BTS-1800	
R29	470KΩ	½		BTS-470K	
R30	470KΩ	½		BTS-470K	
R31	47KΩ	½		BTS-47K	
R32	47KΩ	½		BTS-47K	
R33	1Meg	½		BTS-1Meg	
R34	47KΩ	½		BTS-47K	
R35	1Meg	½		BTS-1Meg	
R36	2200Ω	½		BTS-2200	
R37	2200Ω	½		BTS-2200	
R38	1Ω	1		BW-1	

♦ Items C14A, C14B, C14C, C14D, R23A, R23B, R1A and R1B are combined in one unit. (part #11899).

TRANSFORMER (POWER)

ITEM No.	RATING				REPLACEMENT DATA					
	PRI.	SEC. 1	SEC. 2	SEC. 3	Altec Lansing PART No.	Halldorson PART No.	Merit PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.
T1	117VAC @.12A	115VAC .005ADC	2.3VCT .460ADC tap @ 5VAC @.2A		6101					

SELENIUM RECTIFIER

ITEM No.	RATING	REPLACEMENT DATA						NOTES
	CURRENT	Altec-Lansing PART No.	FEDERAL PART No.	INTERNATIONAL PART No.	MALLORY PART No.	RADIO RECEPTOR PART No.	SARKES TARZIAN PART No.	
M1	.005ADC		1263①		8S20①	8Y1	50①	① Fabricate mounting
M2	.005ADC		1263 ①		8S20 ①	8Y1	50 ①	
M3	.460ADC		104C1AX1				4N26IC1-ZS	

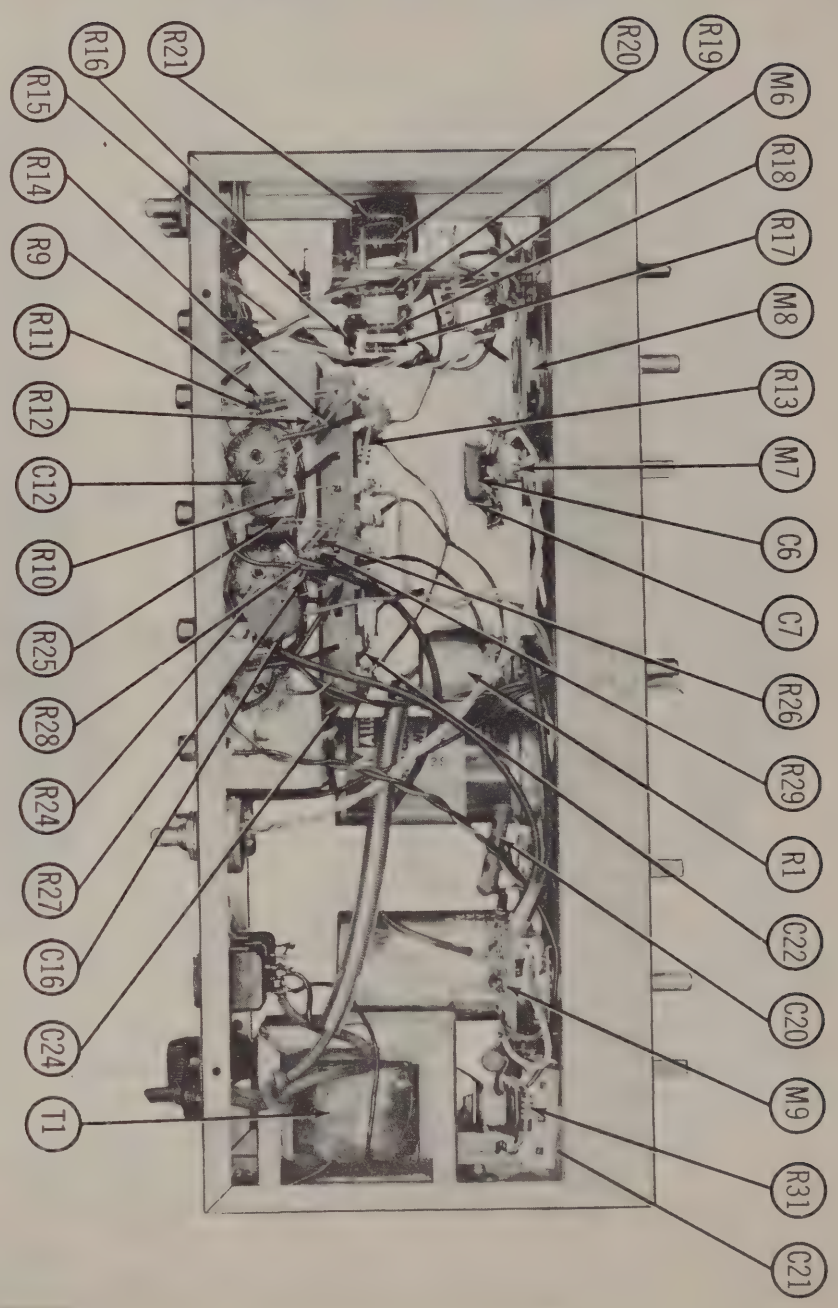
FUSES

ITEM No.	TYPE	RATING	REPLACEMENT DATA					
			Altec Lansing PART No.		LITTELFUSE PART No.		BUSS PART No.	
			FUSE	HOLDER	FUSE	HOLDER	FUSE	HOLDER
M4	3AG	1/2A 250V			312.500 (3AG 1/2A)	342001	AGC 1/2	HKP

MISCELLANEOUS

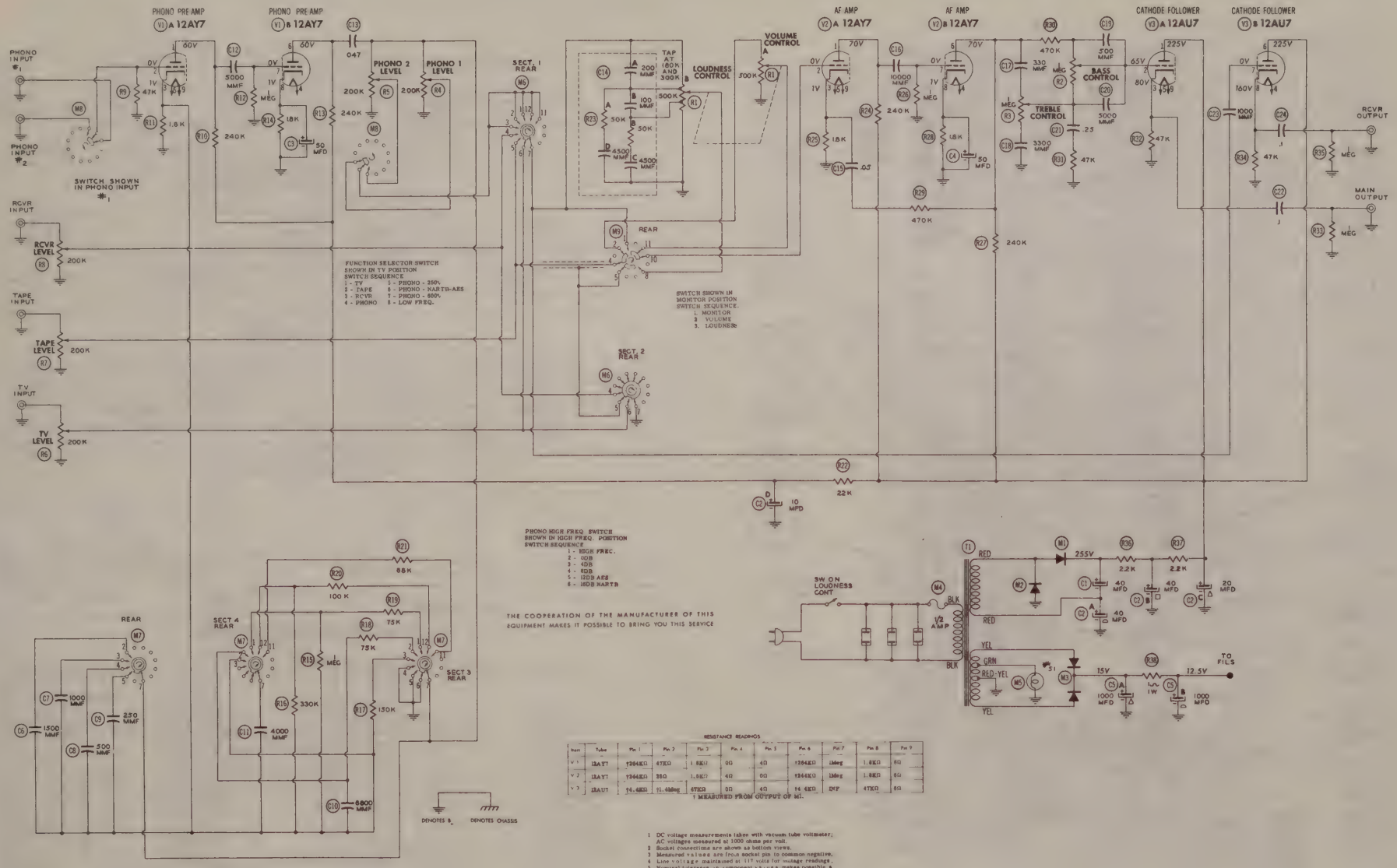
ITEM No.	PART NAME	Altec Lansing PART No.	NOTES
M5	Pilot Light		#51
M6	Switch	11894	Selector & phono low freq. compensation(Rotary-wafer type)
M7	Switch	11895	Phono high freq. compensation (Rotary-wafer type)
M8	Switch	11897	Phono 1 & 2 (Rotary-wafer type)
M9	Switch	12022	Tape monitor, volume, loudness (Rotary-wafer type)

CHASSIS—BOTTOM VIEW



ALTEC LANSING
Model A-440A

ALTEC LANSING
Model A-440A



THE COOPERATION OF THE MANUFACTURER OF THIS EQUIPMENT MAKES IT POSSIBLE TO BRING YOU THIS SERVICE

RESISTANCE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8	Pin 9
V 1	12AY7	†264KΩ	47KΩ	1.8KΩ	0Ω	4Ω	†264KΩ	1Meg	1.8KΩ	0Ω
V 2	12AY7	†264KΩ	38Ω	1.8KΩ	4Ω	0Ω	†264KΩ	1Meg	1.8KΩ	0Ω
V 3	12AU7	†4.6KΩ	†1.4KΩ	47KΩ	0Ω	4Ω	†4.6KΩ	DVF	47KΩ	0Ω

† MEASURED FROM OUTPUT OF M1.

1 DC voltage measurements taken with vacuum tube voltmeter; AC voltages measured at 1000 ohms per volt.
2 Socket connections are shown as bottom views.
3 Measured values are from socket pin to common negative.
4 Line voltage maintained at 117 volts for voltage readings.
5 Nominal tolerance of component values makes possible a variation of ± 15% in voltage and resistance readings
6 All controls at minimum, proper output load connected

A PHOTOFACT STANDARD NOTATION SCHEMATIC

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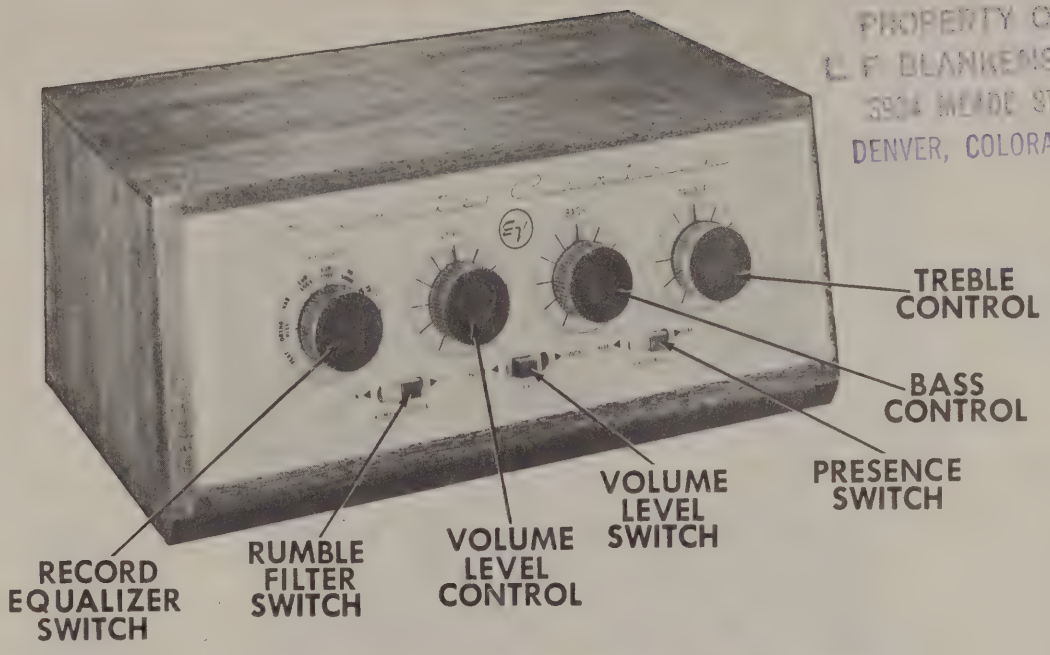
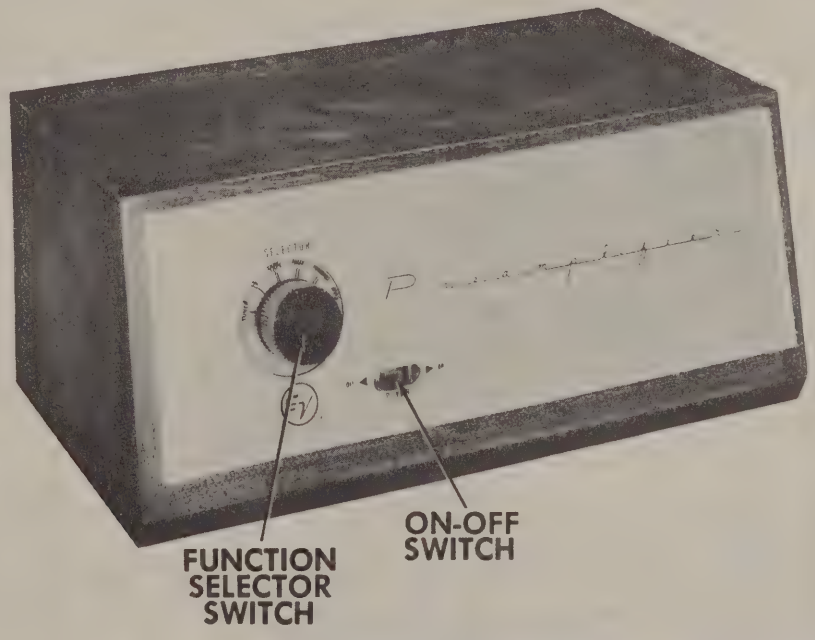
DENVER, COLORADO

ELECTRO-VOICE MODELS
PRC-1, PRC-2





ELECTRO-VOICE MODELS
PRC-1, PRC-2

TRADE NAME	Electro-Voice Model PRC1, PRC2, and Magnetic Cartridge Equalizer M1
MANUFACTURER	Electro-Voice, Inc., Buchanan, Michigan
TYPE SET	Audio Equalizer-Preamplifier and Remote Control Unit With Magnetic Phonograph Cartridge Preamplifier
TUBES (Four)	Types: 6C4 Preamp., 12AY7 Mag. Equalizer Preamp., 12AY7 AF Amp., 12AX7 AF Amp.-Cath. Follower

THESE UNITS ARE DESIGNED TO OPERATE WITH ELECTRO-VOICE, MODEL A30 POWER AMPLIFIER OR AN EQUIVALENT POWER AMPLIFIER PROVIDING THE NECESSARY OPERATING VOLTAGES. MODELS PRC1 & PRC2 ARE IDENTICAL EXCEPT MODEL PRC2 HAS NO PROVISIONS FOR MAGNETIC PHONOGRAPH CARTRIDGES. MODEL PRC2 MAY BE CONVERTED TO MODEL PRC1 BY ADDING MAGNETIC CARTRIDGE UNIT M1.

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PARTS LIST AND DESCRIPTIONS

TUBES (SYLVANIA, GENERAL ELECTRIC, WESTINGHOUSE)

ITEM No.	USE	REPLACEMENT DATA		RETMA BASE TYPE	NOTES
		Electro-Voice PART No.	STANDARD REPLACEMENT		
V1	Preamplifier	6C4	6C4	6BG	
V2	Equalizer Preamp.	12AY7	12AY7	9A	
V3	AF Amplifier	12AY7	12AY7	9A	
V4	AF Amplifier-Cathode Equalizer	12AX7	12AX7	9A	

ELECTROLYTIC CAPACITORS

ITEM No.	RATING		REPLACEMENT DATA				NOTES
	CAP.	VOLT.	Electro-Voice PART No.	MALLORY PART No.	PYRAMID PART No.	SANGAMO PART No.	
C1A	▲15	475		FP258	TM-D20-450	D-260	
B	■15	475					
C2A	■15	450		FP345.5	TM-D15-450	T-660	
B	▲15	450			TD-50-25	MMT-0220	
C	40	25					
C3A	■10	450		FP345.2	TM-3045	T-645	
B	▲10	450					
C	20	25					
C4A	■10	450		FP231	TM-D10-450	D-200	
B	▲10	450					

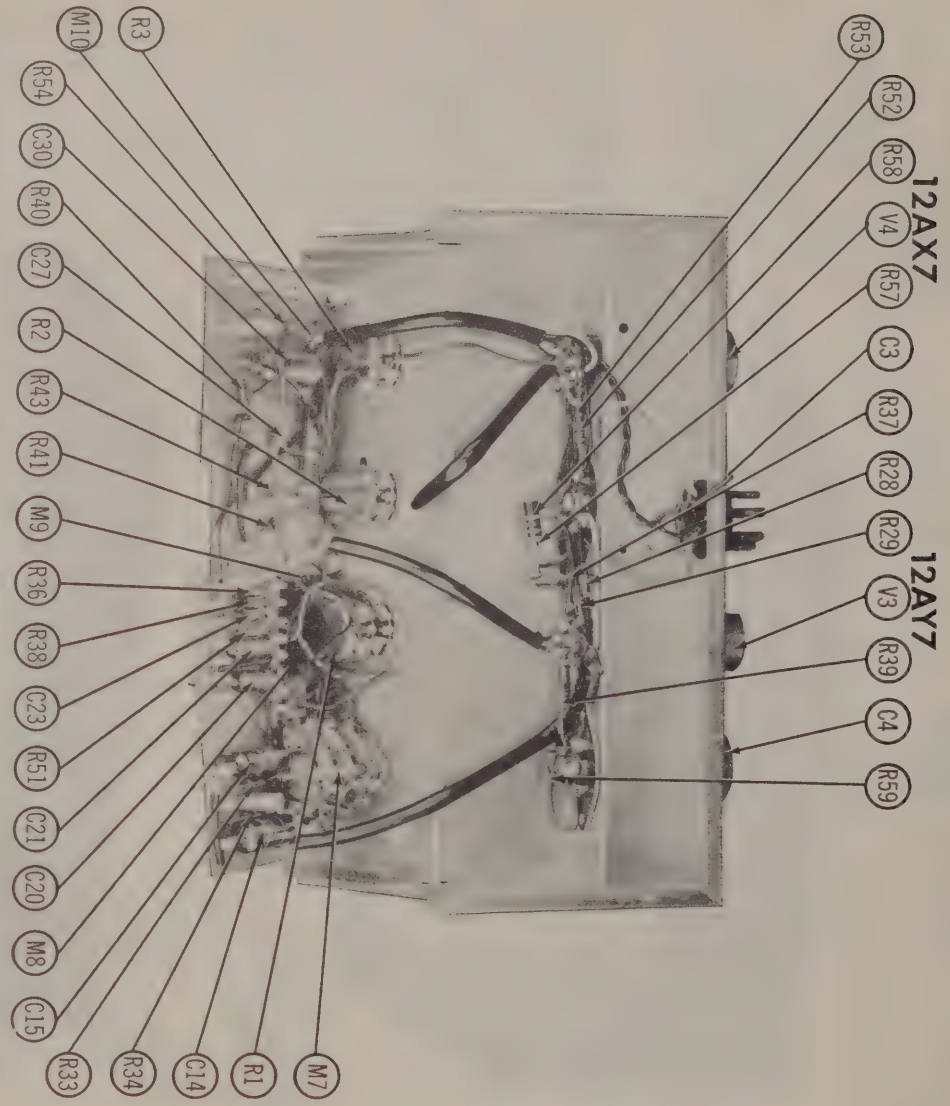
FIXED CAPACITORS

Capacity values given in the rating column are in mfd. for Paper Capacitors, and in mmfd. Mica and Ceramic Capacitors.

ITEM No.	RATING		REPLACEMENT DATA				NOTES
	CAP.	VOLT.	Electro-Voice PART No.	CENTRALAB PART No.	ERIE PART No.	MALLORY PART No.	
C5	.01	400		D6-103	GP3-333-103	PT411	
C6	.01	400		D6-103	GP3-333-103	PT411	
C7	.0022	400		D6-222	GP2-333-222	PT6222	
C8	.0033	400		D6-332	GP2-333-332	PT6233	
C9	.022	400		DF-203	817-02	PT4122	
C10	2	200					
C11	.01	400		D6-103	GP3-333-103	PT411	
C12	.01	400		D6-103	GP3-333-103	PT411	
C13	.022	400		DF-203	817-02	PT4122	
C14	.047	400		DF-503		PT4147	
C15	.015	400		D16-153		PT6115	
C16	.0015	400		D6-152	GP2L-152		
C17	800			DD-801		MC251	
C18	800			DD-801		MC251	
C19	.01	400		D6-103	GP3-333-103	PT411	
C20	.01	400		D6-103	GP3-333-103	PT411	
C21	.01	400		D6-103	GP3-333-103	PT411	
C22	400			D6-401		MC243	Note 1
C23	5000	200		D6-502	GP2-333-502	UC-525	
C24	.047	400		DF-503		PT4147	
C25	.001	400		D6-102	GP2L-102	PT621	
C26	.01	400		D6-103	GP3-333-103	PT411	
C27	200			DD-201	811-201	UC-532	
C28	.0022	400		D6-222	817-02	UC-5222	
C29	.01	400		D6-103	GP3-333-103	PT411	
C30	.1	600		DF-104		PT601	
C31	.01	400		D6-103	GP3-333-103	PT411	

Note 1. Some versions may use a 300MMF capacitor in this application.

REMOTE CHASSIS-FRONT PANEL-REAR VIEW



PARTS LIST AND DESCRIPTIONS (Continued)

CONTROLS

ITEM No.	RATING		REPLACEMENT DATA					INSTALLATION NOTES
	RESIST. ANCE	WATTS	Electro-Voice PART No.	CENTRALAB PART No.	CLAROSTAT PART No.	IRC PART No.	MALLORY PART No.	
R1A	250KΩ	½	E4686			Q13-130	UF254A	Level (Panel)
B	250KΩ	½				M11-130	UR254L	Attach to R1A (Rear)
C	Shaft						DS-36	Attach to R1A
R2A	1Meg	½	F4686	B-70	A47-1Meg-Z	Q13-137	U-53	Bass
B	Shaft		Not Req.	Not Req.	PS-3	Not Req.	Not Req.	Attach to R2A
R3A	1Meg	½	F4686	B-70	A47-1Meg-Z	Q13-137	U-53	Treble
B	Shaft		Not Req.	Not Req.	PS-3	Not Req.	Not Req.	Attach to R3A
R4A	1Meg	½	H4686	AB-70	A47-1Meg-Z	Q13-137	U-53	Magnetic Level
B	Shaft		Not Req.	AK-1	FKS-1/4	BQ	Not Req.	Attach to R4A
R5A	500KΩ	½	G4686	AB-60	A47-500K-Z	Q13-133	U-48	Auxiliary Level
B	Shaft		Not Req.	AK-1	FKS-1/4	BQ	Not Req.	Attach to R5A
R6A	500KΩ	½	G4686	AB-60	A47-500K-Z	Q13-133	U-48	Tape Level
B	Shaft		Not Req.	AK-1	FKS-1/4	BQ	Not Req.	Attach to R6A
R7A	500KΩ	½	G4686	AB-60	A47-500K-Z	Q13-133	U-48	TV Level
B	Shaft		Not Req.	AK-1	FKS-1/4	BQ	Not Req.	Attach to R7A
R8A	500KΩ	½	G4686	AB-60	A47-500K-Z	Q13-133	U-48	Tuner Level
B	Shaft		Not Req.	AK-1	FKS-1/4	BQ	Not Req.	Attach to R8B

RESISTORS

ITEM No.	RATING		REPLACEMENT DATA		NOTES
	OHMS	WATT	Electro-Voice PART No.	IRC PART No.	
R9	22Meg	½		BTS-22Meg	
R10	1.2Meg	½		BTS-1.2Meg	
R11	4700Ω	½		BTS-4700	
R12	47KΩ	1		BTA-47K	
R13	33KΩ	½		BTS-33K	
R14	470KΩ	½		BTS-470K	
R15	47KΩ	½		BTS-47K	
R16	47KΩ	½		BTS-47K	
R17	150KΩ	½		BTS-150K	
R18	1800Ω	½		BTS-1800	
R19	120KΩ	½		BTS-120K	
R20	82KΩ	½		BTS-82K	
R21	1.2Meg	½		BTS-1.2Meg	
R22	1800Ω	½		BTS-1800	
R23	120KΩ	½		BTS-120K	
R24	10KΩ	½		BTS-10K	
R25	10KΩ	½		BTS-10K	
R26	47KΩ	½		BTS-47K	
R27	27KΩ	½		BTS-27K	
R28	820Ω	½		BTS-820	
R29	82KΩ	½		BTS-82K	
R30	270KΩ	½		BTS-270K	
R31	270KΩ	½		BTS-270K	
R32	100KΩ	½		BTS-100K	
R33	270KΩ	½		BTS-270K	
R34	270KΩ	½		BTS-270K	

ITEM No	RATING		REPLACEMENT DATA		NOTES
	OHMS	WATT	Electro-Voice PART No.	IRC PART No	
R35	1.2Meg	½		BTS-1.2Meg	
R36	20KΩ 5%	½		BTS-20K 5%	
R37	22000	½		BTS-2200	
R38	3300Ω	½		BTS-3300	
R39	39KΩ	½		BTS-39K	
R40	1.2Meg	½		BTS-1.2Meg	
R41	120KΩ	½		BTS-120K	
R42	10KΩ	½		BTS-10K	
R43	120KΩ	½		BTS-120K	
R44	12Meg	½		BTS-12Meg	
R45	12Meg	½		BTS-12Meg	
R46	12Meg	½		BTS-12Meg	
R47	12Meg	½		BTS-12Meg	
R48	330KΩ	½		BTS-330K	
R49	47KΩ	½		BTS-47K	
R50	470KΩ	½		BTS-270K	
R51	1.2Meg	½		BTS-1.2Meg	
R52	3300Ω	½		BTS-3300	
R53	82KΩ	½		BTS-82K	
R54	1.2Meg	½		BTS-1.2Meg	
R55	1000Ω	½		BTS-1000	
R56	47KΩ	1		BTA-47K	
R57	47KΩ	½		BTS-47K	
R58	47MΩ	1		BTA-47M	
R59	47KΩ	½		BTS-47K	

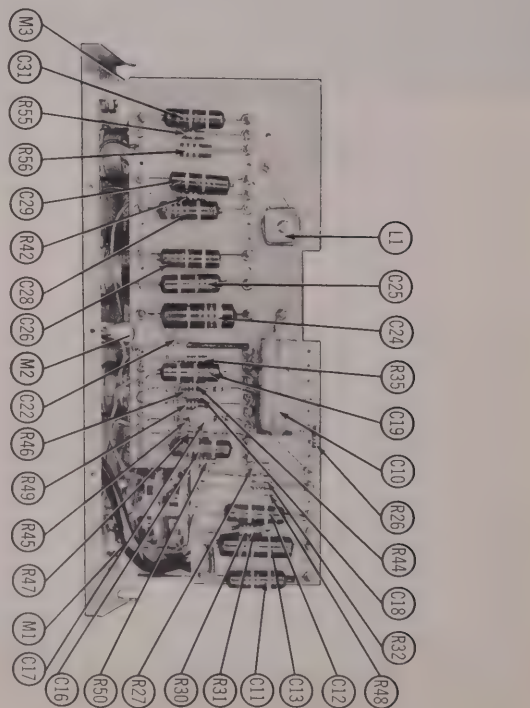
COILS (RF-IF)

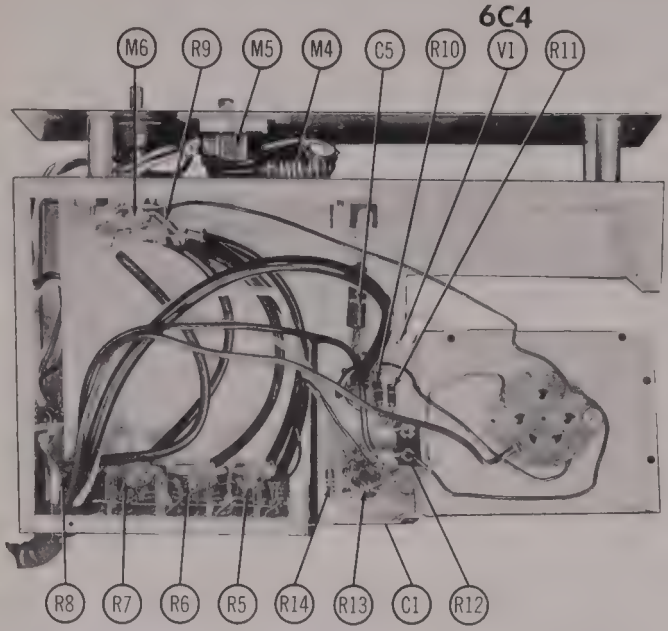
ITEM No.	USE	DC RES.		REPLACEMENT DATA				NOTES
		PRI.	SEC.	Electro-Voice PART No.	MEISSNER PART No.	MERIT PART No.	MILLER PART No.	
L1	Tone Choke	660Ω						100 Microhenries

MISCELLANEOUS

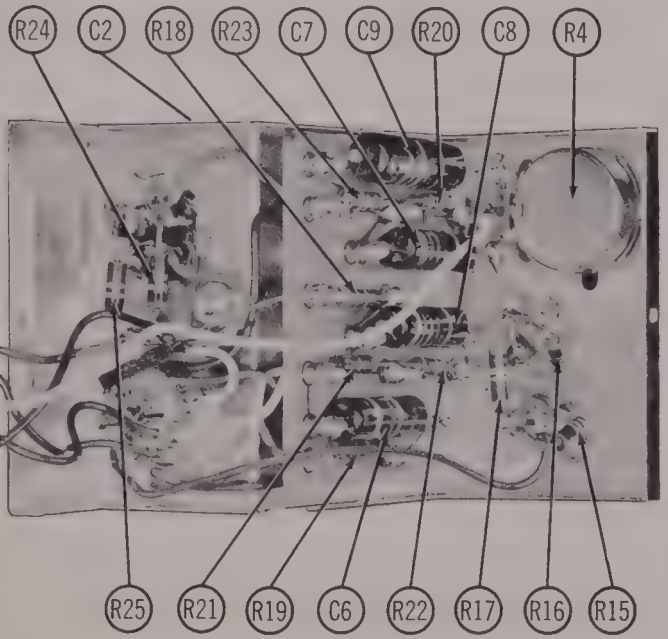
ITEM No.	PART NAME	Electro-Voice PART No.	NOTES
M1	Pilot Light		#47, Remote control unit
M2	Pilot Light		#47, Remote control unit
M3	Pilot Light		#47, Remote control unit
M4	Pilot Light		Preamplifier unit - 3 watt - 120V
M5	Switch		Power (on-off)
M6	Switch		Selector (Rotary-wafer type)
M7	Switch		Record Equalization (Rotary-wafer type)
M8	Switch		Rumble Filter (SPST-Slide type)
M9	Switch		Level (DPDT-Slide type)
M10	Switch		Presence (SPST-Slide type)
M11	Dummy Plug		Used with model PRC2 only

REMOTE CHASSIS - BOTTOM VIEW

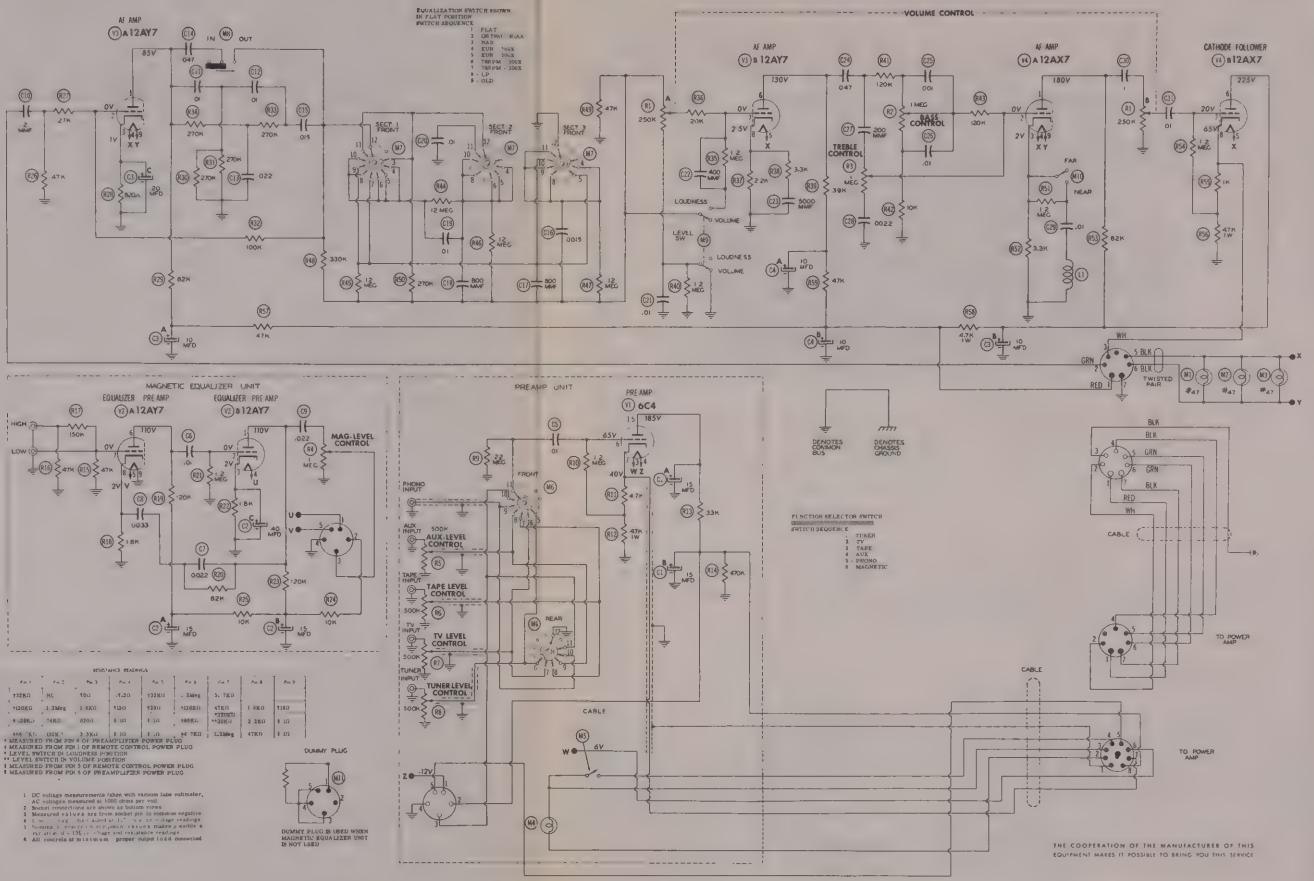




PRE-AMP. CHASSIS - BOTTOM VIEW



MAGNETIC CARTRIDGE EQUALIZER



RESISTANCE READINGS

	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8	Pin 9
6C4	330KΩ	INF.	90Ω	4.2Ω	330KΩ	2.3MEG	3.7KΩ		
12AY7	320KΩ	2.3MEG	1.8KΩ	520	920Ω	320KΩ	47KΩ *220KΩ	1.8KΩ	980
12AY7	4.2MEG	74KΩ	820Ω	8.1Ω	8.1Ω	680KΩ	**220KΩ	2.2KΩ	8.1Ω
12AX7	440.7KΩ	100K Ω	2.3KΩ	8.1Ω	8.1Ω	64 TKΩ	1.34MEG	47KΩ	8.1Ω

* SEE NOTE 7 FROM PIN 9 OF REMOTE CONTROL POWER PLUG
† MEASURED FROM PIN 7 OF REMOTE CONTROL POWER PLUG
‡ LEVEL SWITCH IN LOUDNESS POSITION
** LEVEL SWITCH IN VOLUME POSITION
§ MEASURED FROM PIN 5 OF REMOTE CONTROL POWER PLUG
¶ MEASURED FROM PIN 6 OF PREAMPLIFIER POWER PLUG

1 DC voltage measurements taken with vacuum tube voltmeter, AC voltages measured at 1000 ohms per volt.
2 Socket connections are shown as bottom views.
3 Measured values are from socket pin to common negative bus with [illegible] set for normal voltage readings.
4 [illegible] make a variable a minimum [illegible] and resistance readings.
5 All controls at minimum — proper output load connected.

THE COOPERATION OF THE MANUFACTURER OF THIS EQUIPMENT MAKES IT POSSIBLE TO BRING YOU THIS SERVICE

A PHOTOFACT STANDARD NOTATION SCHEMATIC
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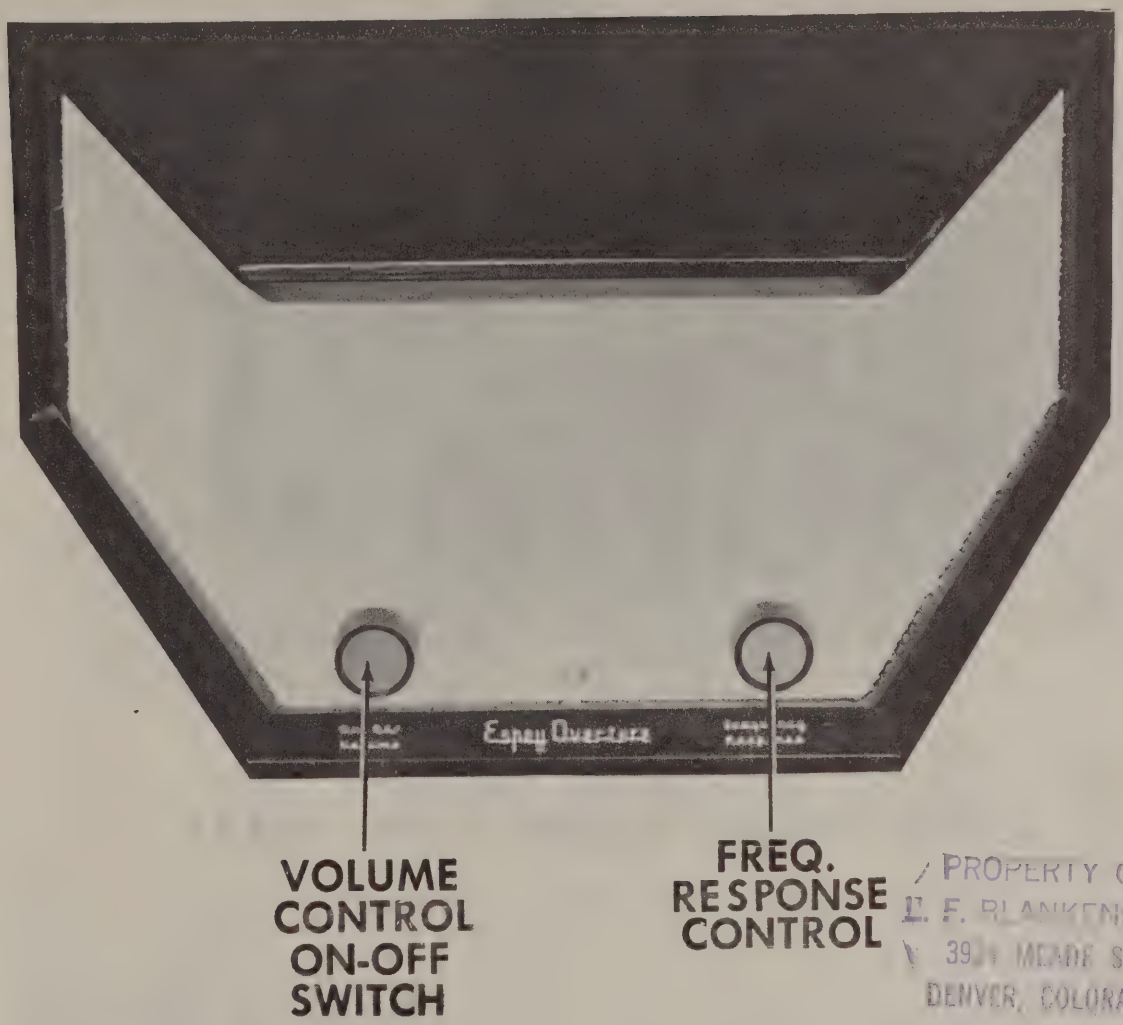
ESPEY MODEL
"Overture"



PROPERTY OF
L. F. BLANKENSHIP
3901 MEADE ST.
DENVER, COLORADO

ESPEY MODEL
"Overture"

TRADE NAME	Espey Model "Overture"
MANUFACTURER	Espey Mfg. Co., Inc., 528 E. 72nd St., New York 21, N.Y.
TYPE SET	AC Operated Audio Amplifier
TUBES (Five)	Types: 12AX7 AF Amp., 12SC7 AF Amp.-Phase Inv., (2) 35L6GT Output, 35Z5GT Rectifier
POWER SUPPLY	110-120 Volts AC-60 Cycles
RATING	.47 Amp. @ 117 Volts AC

HOWARD W. SAMS & CO., INC. • Indianapolis 5, Indiana

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PARTS LIST AND DESCRIPTIONS

ESPEY
Model "Overture"

TUBES (SYLVANIA, GENERAL ELECTRIC, WESTINGHOUSE)

ITEM No.	USE	REPLACEMENT DATA		RETMA BASE TYPE	NOTES
		ESPEY PART No.	STANDARD REPLACEMENT		
V1	AF Amp.	12AX7	12AX7	9A	
V2	AF Amp.-Phase Inv.	12SC7	12SC7	8S	
V3	Audio Output	35L6GT	35L6GT	7S	
V4	Audio Output	35L6GT	35L6GT	7S	
V5	Rectifier	35Z5GT	35Z5GT	6AD	

ELECTROLYTIC CAPACITORS

ITEM No.	RATING		REPLACEMENT DATA				NOTES
	CAP.	VOLT.	ESPEY PART No.	MALLORY PART No.	PYRAMID PART No.	SANGAMO PART No.	
C1A	20	450		FP234	TM-D20-450	D-215	
B	20	450					
C2A	24	400		FP237	TM-D30-450	T-140	
B	24	400					

FIXED CAPACITORS

Capacity values given in the rating column are in mfd. for Paper Capacitors, and in mmfd. Mica and Ceramic Capacitors.

ITEM No.	RATING		REPLACEMENT DATA				NOTES
	CAP.	VOLT.	ESPEY PART No.	CENTRALAB PART No.	ERIE PART No.	MALLORY PART No.	
C3	.05	400		DF-503		PT415	
C4	.25	400				PT4025	
C5	5000			DD-502	811-005	DC525	
C6	20000			DD-203	817-02	PT412	
C7	.006	600			GP-333-602	PT626	
C8	.006	600			GP-333-602	PT626	
C9	.05	200		DF-503		PT415	
C10	470	500		D6-471	811-471	MCK347	
C11	.1	400		DF-104		PT401	
C12	.1	400		DF-104		PT401	
C13	.05	400		DF-503		PT415	
C14	.05	400		DF-503		PT415	

CONTROLS

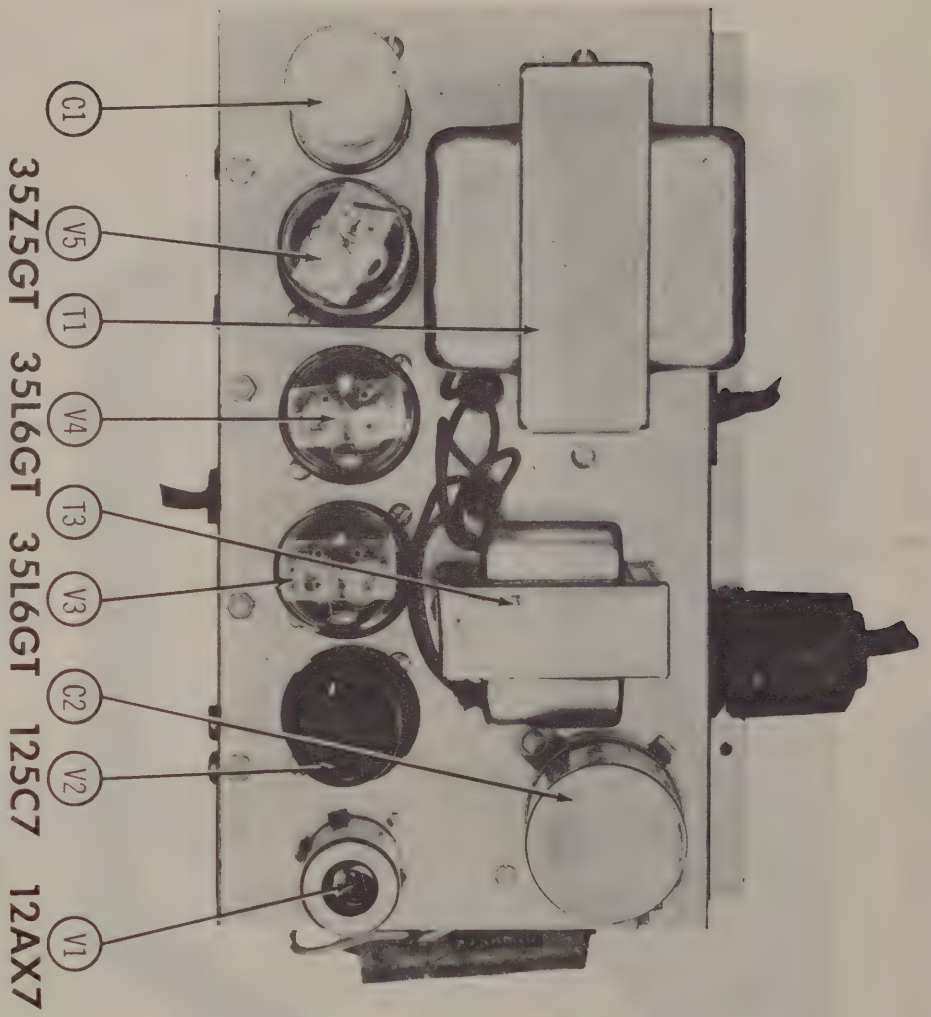
ITEM No.	RATING		REPLACEMENT DATA					INSTALLATION NOTES
	RESISTANCE	WATTS	ESPEY PART No.	CENTRALAB PART No.	CLAROSTAT PART No.	IRC PART No.	MALLORY PART No.	
R1A	500KΩ	½	A9.346	BT-63-S	A47F4-500K	Q18-133X	UT-429	Volume-Tap-50K
B	Shaft		Not Req.	Not Req.	FS-3	Not Req.	Not Req.	Attach to R1A.
C	Switch		Not Req.	Not Req.	SWE-12	76-1	US-26	Attach to R1A.
R2A	1.5Meg	½	A9.347B		A47-1.5Meg-S	Q11-138	U-155	Freq. Response
B	Shaft		Not Req.		FS-3	Not Req.	Not Req.	Attach to R2A.

RESISTORS

ITEM No.	RATING		REPLACEMENT DATA		NOTES
	OHMS	WATT	ESPEY PART No.	IRC PART No.	
R3	470KΩ	½		BTS-470K	
R4	470KΩ	½		BTS-470K	
R5	6800Ω	½		BTS-6800	
R6	4700Ω	½		BTS-4700	
R7	68KΩ	½		BTS-68K	
R8	3900Ω	½		BTS-3900	
R9	270KΩ	½		BTS-270K	
R10	1500Ω	½		BTS-1500	
R11	15Ω 5%	½		BTS-15	
R12	120KΩ	½		BTS-120K	
R13	100KΩ	½		BTS-100K	

ITEM No.	RATING		REPLACEMENT DATA		NOTES
	OHMS	WATT	ESPEY PART No.	IRC PART No.	
R14	82KΩ	½		BTS-82K	
R15	10Meg	½		BTS-10Meg	
R16	120KΩ	½		BTS-120K	
R17	6800Ω	½		BTS-6800	
R18	120KΩ	½		BTS-120K	
R19	220KΩ	½		BTS-220K	
R20	68Ω	2			
R21	220KΩ	½		BTS-220K	
R22	18KΩ	1		BTB-18K	
R23	150Ω	10		PW10-150	

CHASSIS—TOP VIEW



PARTS LIST AND DESCRIPTIONS (Continued)

TRANSFORMER (POWER)

ITEM No.	RATING				REPLACEMENT DATA					
	PRI.	SEC. 1	SEC. 2	SEC. 3	ESPEY PART No.	Halldorson PART No.	Merit PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.
T1	117VAC @ .47A	191VAC .075ADC Tap @ 120VAC @ .15A	6.3VCT @ .41A		18.138					

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	IMPEDANCE		REPLACEMENT DATA						NOTES
	PRI.	SEC.	ESPEY PART No.	Halldorson PART No.	Merit PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.	
T2	4.88KΩ	3.6Ω		Z1110	A-3026	A-3356 ①	26S48	S-6X	① Drill one new mtg. hole.
T3	6KΩCT	8.4Ω*	A15.038-B						

*500Ω & 16Ω taps not used.

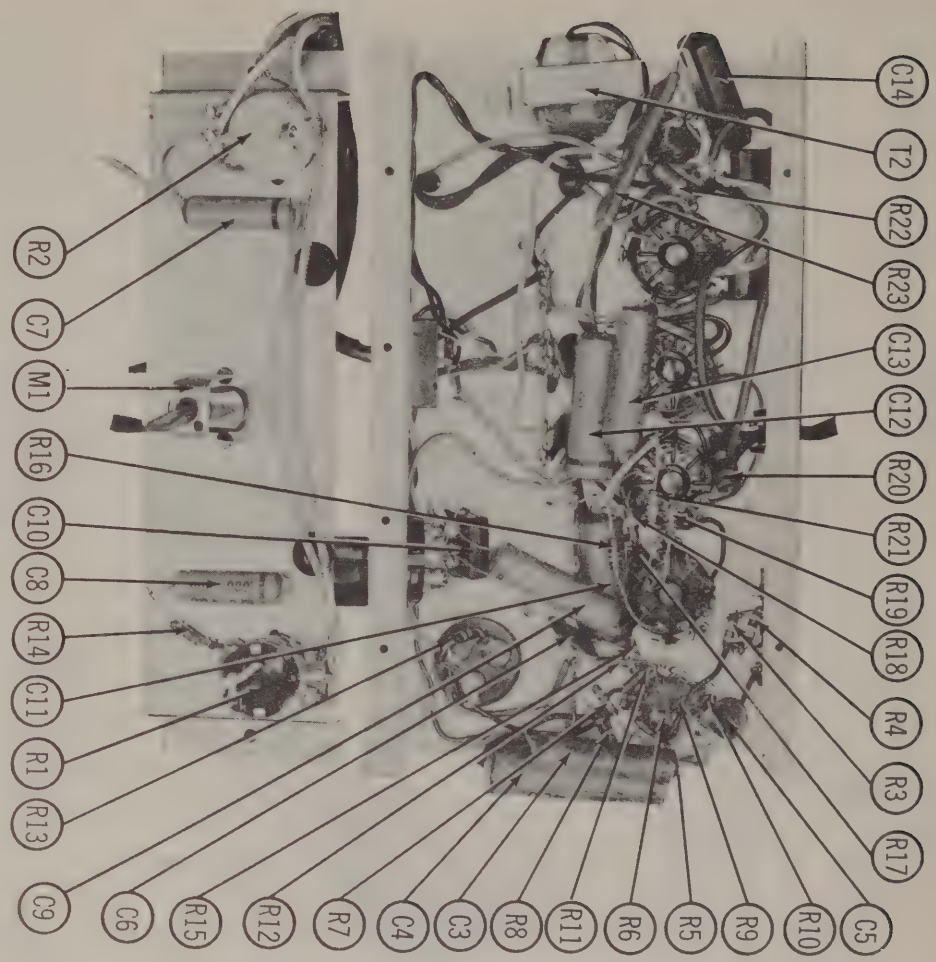
SPEAKER

ITEM No.	RATINGS			REPLACEMENT DATA		NOTES
	SIZE	FIELD	V. C. IMP.	ESPEY PART No.	QUAM PART No.	
SP1	4"	PM	3.6Ω		4A07	
SP2	6"	PM	4.2Ω	RL-123A-2	6A21	
SP3	6"	PM	4.2Ω	RL-123A-2	6A21	

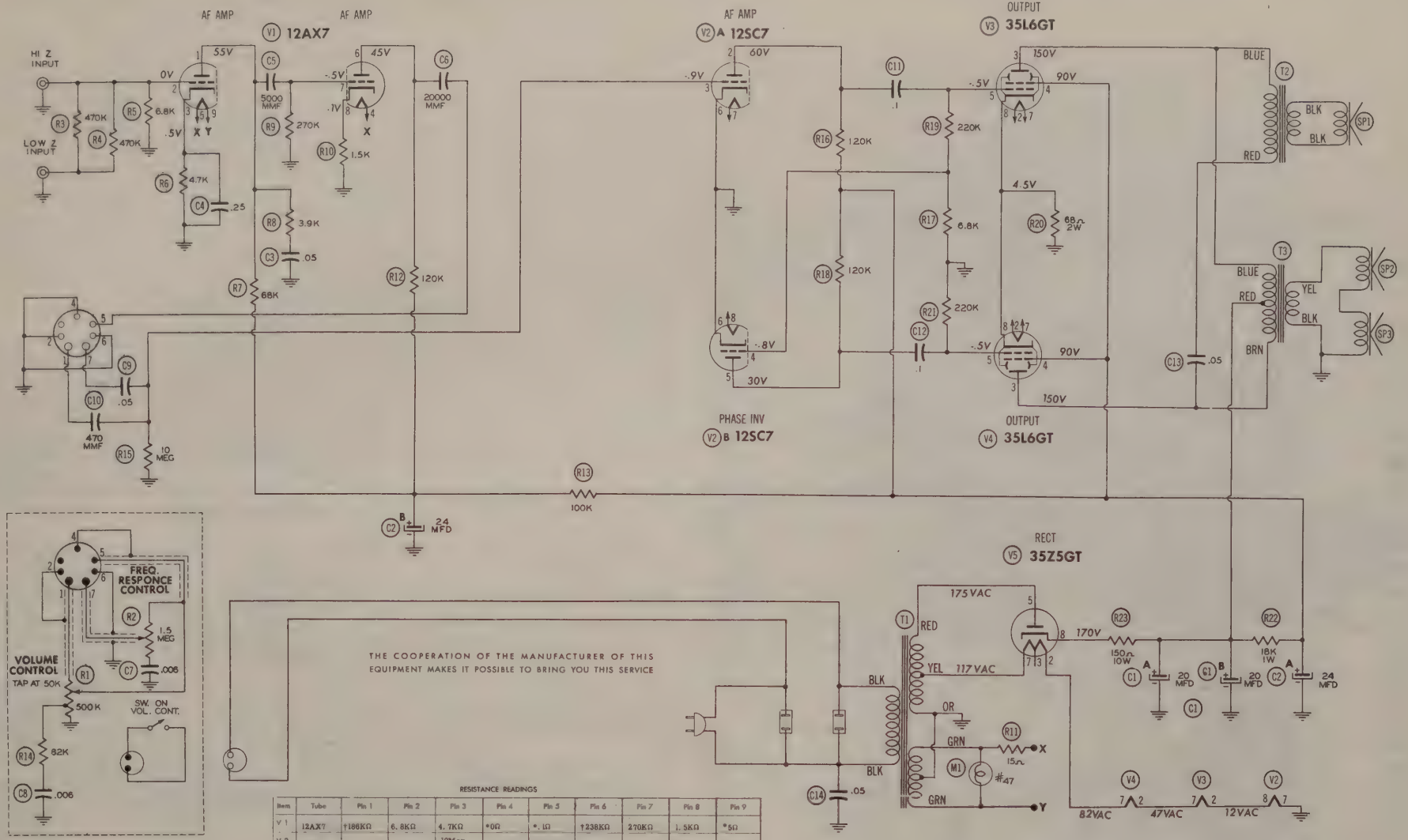
MISCELLANEOUS

ITEM No.	PART NAME	ESPEY PART No.	NOTES
M1	Pilot Light		#47, Bayonet

CHASSIS—BOTTOM VIEW



ESPEY
Model "Overture"



RESISTANCE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8	Pin 9
V 1	12AX7	†186KΩ	6.8KΩ	4.7KΩ	*0Ω	*.1Ω	†238KΩ	270KΩ	1.5KΩ	*5Ω
V 2	12SC7	TP	†138KΩ	10Meg	6.8Meg	†138KΩ	0Ω	0Ω	12Ω	
V 3	35L6GT	NC	12Ω	†350Ω	†18.1KΩ	226.8KΩ	NC	33Ω	68Ω	
V 4	35L6GT	NC	33Ω	†350Ω	†18.1KΩ	220KΩ	TP	35Ω	68Ω	
V 5	35Z5GT	NC	35Ω	32Ω	TP	85Ω	TP	17Ω	2.5Meg	

†MEASURED FROM PIN 8 OF V1.
*MEASURED FROM PIN 4 OF V1.
TP-TIE POINT.
NC-NO CONNECTION.

1. DC voltage measurements taken with vacuum tube voltmeter; AC voltages measured at 1000 ohms per volt.
2. Socket connections are shown as bottom views.
3. Measured values are from socket pin to common negative.
4. Line voltage maintained at 117 volts for voltage readings.
5. Nominal tolerance on component values makes possible a variation of ± 15% in voltage and resistance readings.
6. All controls at minimum, proper output load connected.

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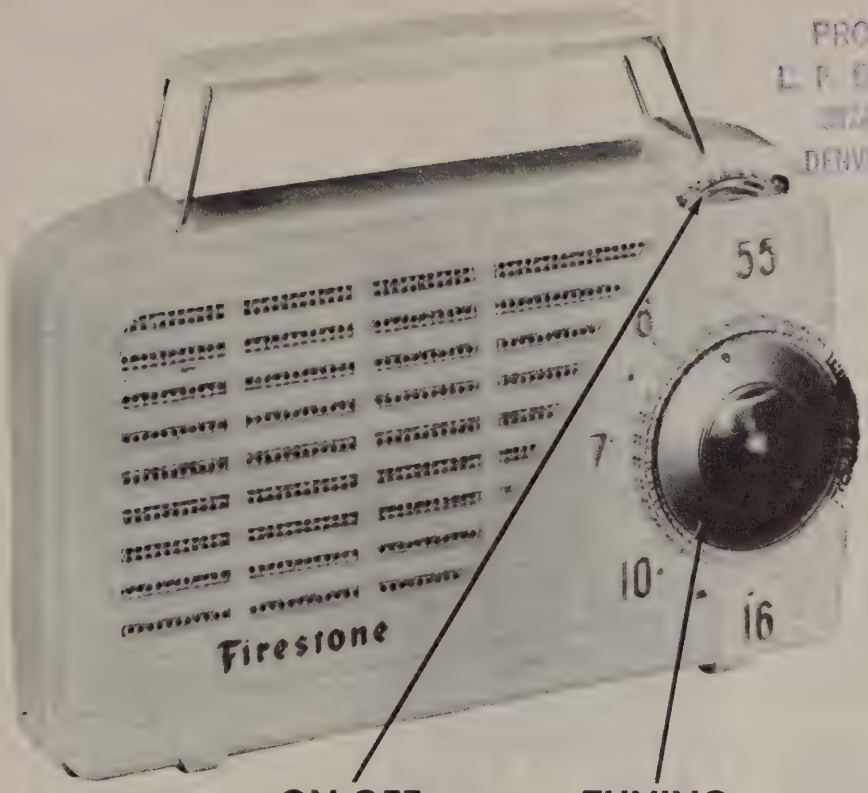
DENVER, COLORADO

FIRESTONE MODEL
4-C-28 (Code 120-5-TT528)



FIRESTONE MODEL
4-C-28 (Code 120-5-TT528)

TRADE NAME	Firestone Model 4-C-28 (Code 120-5-TT528)
SUPPLIER	Firestone Tire & Rubber Co., 1200 Firestone Pkwy., Akron, Ohio
TYPE SET	Battery Operated Portable AM Superheterodyne Receiver
TUBES (Four)	Types: 1V6 Conv., 1AH4 IF Amp., 1AJ5 Det.-AVC-AF Amp., 1AG4 Output
POWER SUPPLY	1.5 Volts "A" Supply & 45 Volts "B" Supply
RATINGS	170MA @ 1.5 Volts DC & 3.5MA @ 45 Volts DC
TUNING RANGE—BROADCAST	540KC-1610KC

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

Volume control should be at maximum position. Output of signal generator should be no higher than necessary to obtain an output reading. Use an insulated alignment screwdriver for adjusting.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	RADIO DIAL SETTING	OUTPUT METER	ADJUST	REMARKS
1.	.1MFD	High side to pin 3 (grid) of 1V6 (VI). Low side to chassis.	455KC (400~Mod)	Tuning gang fully open	Across voice coil	A1, A2, A3, A4	Adjust for maximum output.
2.	"	"	1610KC	"	"	A5	"
3.		Loop	1400KC	Tune to 1400KC signal	"	A6	Fashion loop of several turns of wire and radiate signal into loop of receiver. Adjust for maximum output.

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PARTS LIST AND DESCRIPTIONS

FIRESTONE
Model 4-C-28

TUBES (SYLVANIA, GENERAL ELECTRIC, WESTINGHOUSE)

ITEM No.	USE	REPLACEMENT DATA		RETMA BASE TYPE	NOTES
		FIRESTONE PART No.	STANDARD REPLACEMENT		
V1	Converter	1V6	1V6		
V2	IF Amplifier	1AH4	1AH4		
V3	Det.-AVC-AF Amp.	1AJ5	1AJ5		
V4	Audio Output	1AG4	1AG4		

ELECTROLYTIC CAPACITORS

ITEM No.	RATING		REPLACEMENT DATA				NOTES
	CAP.	VOLT.	FIRESTONE PART No.	MALLORY PART No.	PYRAMID PART No.	SANGAMO PART No.	
C1	10	50	CE-528	TC32	TD-10-50	FM-0510	

FIXED CAPACITORS

Capacity values given in the rating column are in mfd. for Paper Capacitors, and in mmfd. Mica and Ceramic Capacitors.

ITEM No.	RATING		REPLACEMENT DATA				NOTES
	CAP.	VOLT.	FIRESTONE PART No.	CENTRALAB PART No.	ERIE PART No.	MALLORY PART No.	
C2	15000		CC153-5	DD16-153	821-015		
C3	2000		CC202-5	DD-202	801-002	DC-522	
C4	5		CC5-5	DD-050	831-050	ZT-555	
C5A	150		♦PC-528				
B	1000						
C	100						
D	10000						
E	1000						
C6	1500		CC152-5	DD-152	801-0015	DC-5215	

♦ Items C5A, C5B, C5C, C5D, C5E, R6A, R6B, R6C and R6D are combined in one unit.

CONTROLS

ITEM No.	RATING		REPLACEMENT DATA					INSTALLATION NOTES
	RESIST-ANCE	WATTS	FIRESTONE PART No.	CENTRALAB PART No.	CLAROSTAT PART No.	IRC PART No.	MALLORY PART No.	
R1	1Meg	½	RV-528					Volume & switch

RESISTORS

ITEM No.	RATING		REPLACEMENT DATA		NOTES
	OHMS	WATT	FIRESTONE PART No.	IRC PART No.	
R2	1Meg	1/3	R105-1/3	BTR-1Meg	
R3	10Meg	1/3	R106-1/3	BTR-10Meg	
R4	4.7Meg	1/3	R475-1/3	BTR-4.7	
R5	100KΩ	1/3	R104-1/3	BTR-100K	Note 1

ITEM No.	RATING		REPLACEMENT DATA		NOTES
	OHMS	WATT	FIRESTONE PART No.	IRC PART No.	
R6A	6.8Meg	1/3	♦PC-528	BTR-6.8Meg	
B	3.9Meg	1/3		BTR-3.9Meg	
C	1Meg	1/3		BTR-1Meg	
D	10Meg	1/3		BTR-10Meg	
R7	1500Ω	1/2	R152	BTS-1500	

♦ Items C5A, C5B, C5C, C5D, C5E, R6A, R6B, R6C, R6D are dombined in one unit.
Note 1. Some versions use a 68KΩ, 1/3W resistor in this application (Mfgr. part #R683-1/3).

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	IMPEDANCE		REPLACEMENT DATA						NOTES
	PRI.	SEC.	FIRESTONE PART No.	Halldorson PART No.	Merit PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.	
T1	12KΩ	21Ω	T2123						

PARTS LIST AND DESCRIPTIONS (Continued)

SPEAKER

ITEM No.	RATINGS			REPLACEMENT DATA		NOTES
	SIZE	FIELD	V. C. IMP.	FIRESTONE PART No.	QUAM PART No.	
SP1	2 3/4"	PM	21Ω	PM528		

COILS (RF-IF)

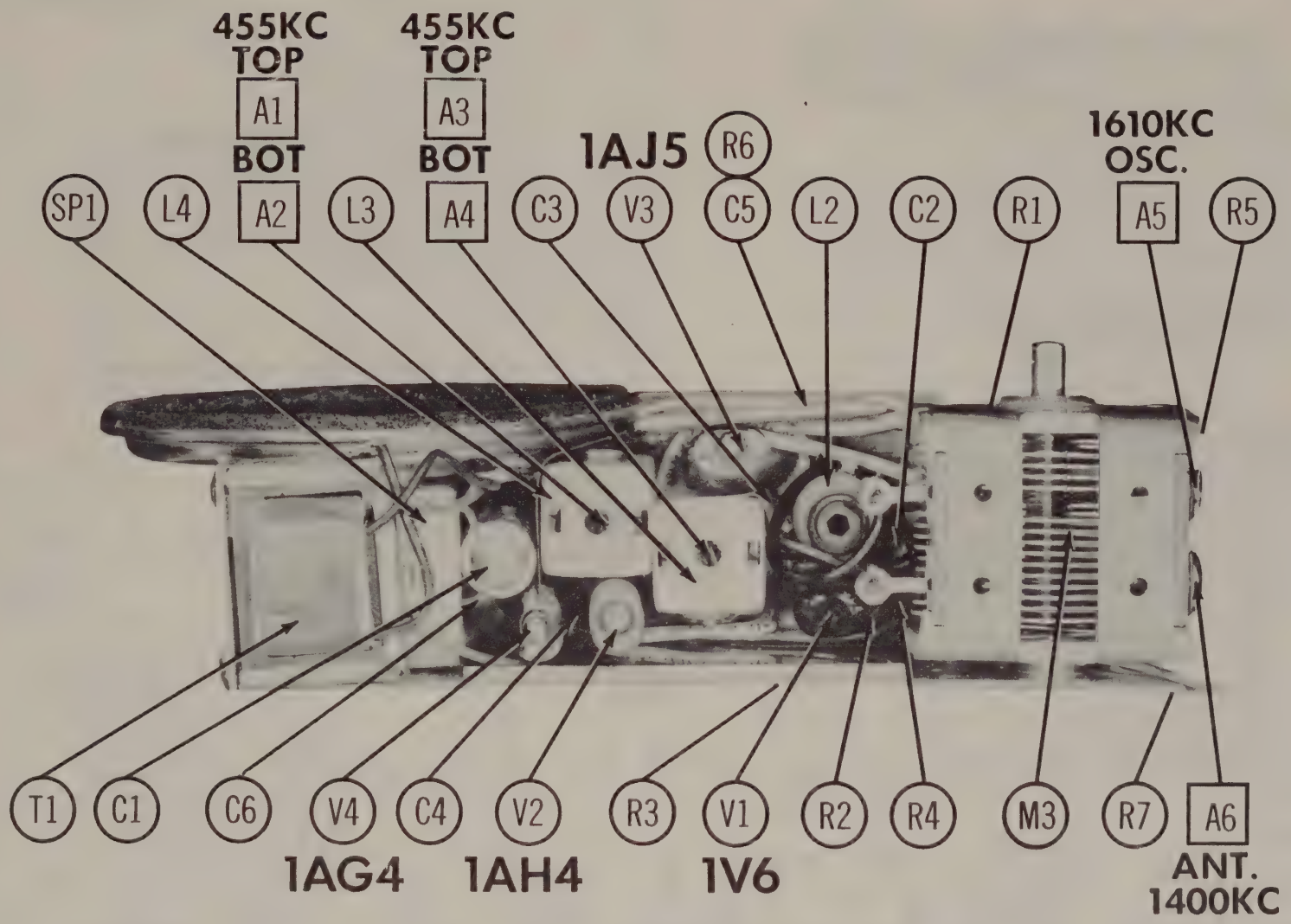
ITEM No.	USE	DC RES.		REPLACEMENT DATA				NOTES
		PRI.	SEC.	FIRESTONE PART No.	MEISSNER PART No.	MERIT PART No.	MILLER PART No.	
L1	Ant. Coil	1.2Ω		LA-528				
L2	Osc. Coil	2.5Ω	6.5Ω	L-528				
L3	Input IF	17Ω	17Ω	392PC	16-6800		10-C1	
L4	Output IF	20Ω	20Ω	385PC	16-6801		10-C2	

BATTERIES

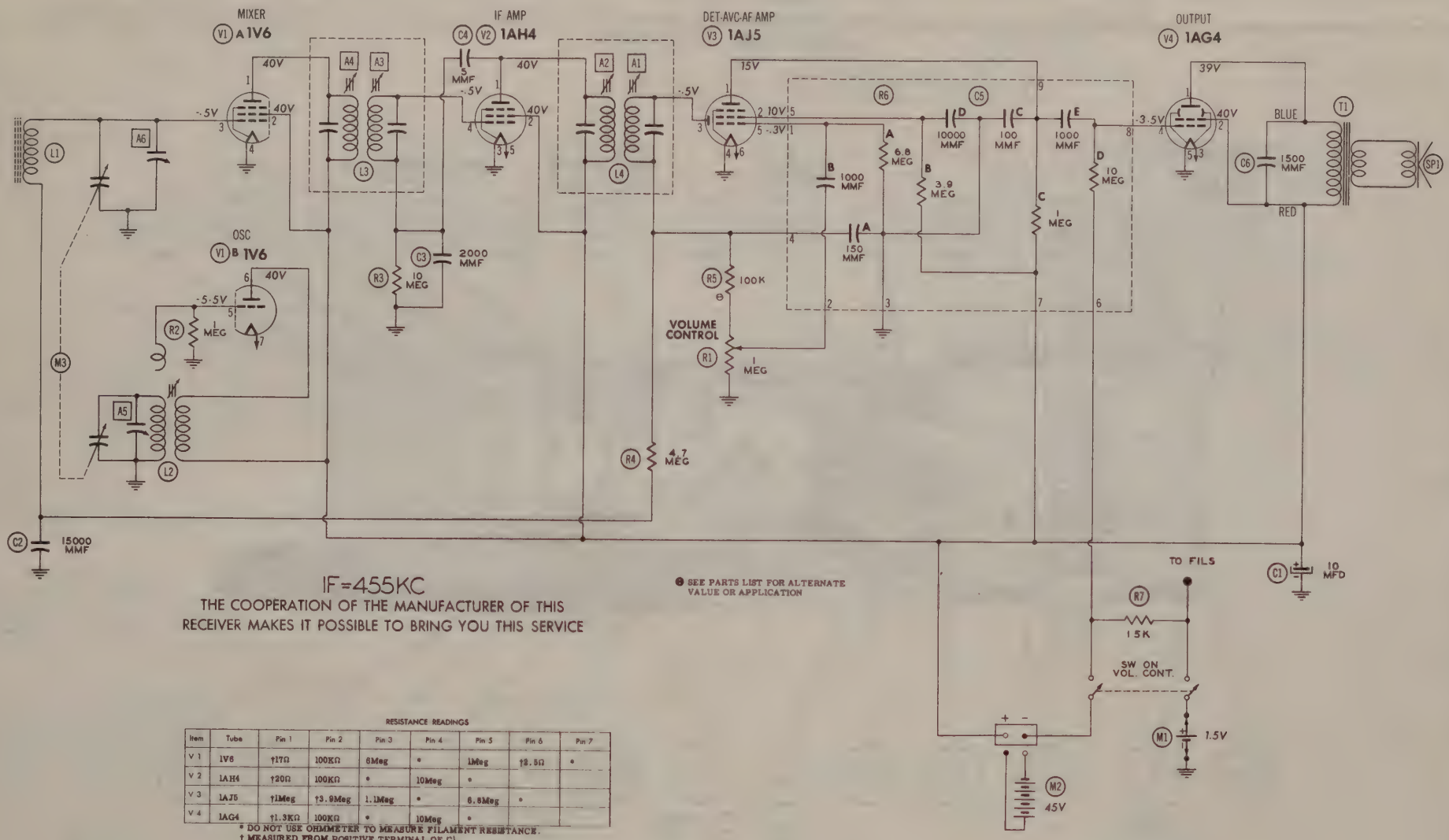
ITEM No.	VOLTAGE	FIRESTONE PART No.	REPLACEMENT DATA						INSTALLATION NOTES
			EVEREADY			BURGESS			
			"A"	"B"	"A-B"	"A"	"B"	"A-B"	
M1	1.5V "A"	7-C-44	950			2R			
M2	45V "B"	4-D-134		415			U30		

MISCELLANEOUS

ITEM No.	PART NAME	FIRESTONE PART No.	NOTES
M3	Tuning Cap.	CV-528	2 Gang (18-265MMF, 10-90MMF)
	Case	H528-1	Less cover and handle - specify color
	Cover	H528-2	Case - specify color
	Handle	H528-3	
	Knob	H530	On-off-volume
	Knob	H529	Tuning



CHASSIS TOP VIEW



IF=455KC

THE COOPERATION OF THE MANUFACTURER OF THIS RECEIVER MAKES IT POSSIBLE TO BRING YOU THIS SERVICE

❻ SEE PARTS LIST FOR ALTERNATE VALUE OR APPLICATION

RESISTANCE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7
V 1	1V6	†17Ω	100KΩ	8Meg	•	1Meg	†2.5Ω	•
V 2	1AH4	†20Ω	100KΩ	•	10Meg	•		
V 3	1AJ5	†1Meg	†3.9Meg	1.1Meg	•	6.8Meg	•	
V 4	1AG4	†1.3KΩ	100KΩ	•	10Meg	•		

* DO NOT USE OHMMETER TO MEASURE FILAMENT RESISTANCE.
† MEASURED FROM POSITIVE TERMINAL OF C1.

1. DC voltage measurements taken with vacuum tube voltmeter; AC voltages measured at 1000 ohms per volt.
2. Socket connections are shown as bottom views.
3. Measured values are from socket pin to common negative.
4. Nominal tolerance on component values makes possible a variation of ± 15% in voltage and resistance readings.
5. Volume control at maximum, no signal applied for voltage measurements.

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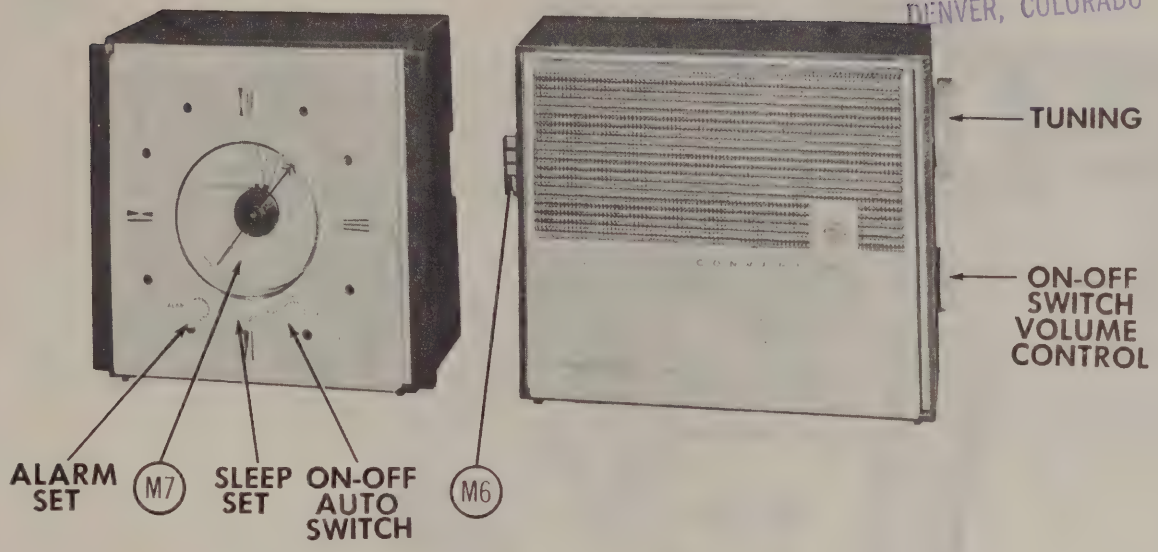

GENERAL ELECTRIC
MODELS 660, 661

TRADE NAME	General Electric Models 660 & 661
MANUFACTURER	General Electric Co., Electronics Dept., Electronics Park, Syracuse, N.Y.
TYPE SET	Portable AM Superheterodyne Receiver With Electric Clock & Power Supply Attachment
TUBES (Four)	Types: 1R5 Conv., 1U4 IF Amp., 1U5 Det.-AVC-AF Amp., 3V4 Output
POWER SUPPLY RATINGS	110-120 Volts AC-60 Cycles (or) 3 Volts "A" Supply & 67.5 Volts "B" Supply .05 Amp. @ 117 Volts AC (or) 150MA @ 3 Volts DC & 8.5MA @ 67.5 Volts DC
TUNING RANGE—BROADCAST	540KC-1600KC

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

Volume control should be at maximum position. Output of signal generator should be no higher than necessary to obtain an output reading. Use an insulated alignment screwdriver for adjusting.
Use battery power, if possible. If AC power is used, use an isolation transformer when available. If not, connect a .1MFD capacitor in series with low side of the signal generator and B-.
Loop should be maintained in same relative position to chassis as when receiver is in cabinet.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	RADIO DIAL SETTING	OUTPUT METER	ADJUST	REMARKS
1.	.1MFD	High side to pin 6 (grid) of 1R5 (V1). Low side to chassis.	455KC (400 Mod)	Tuning gang fully open	Across voice coil	A1, A2, A3, A4	Adjust for maximum output. If AC power is used without an isolation transformer, reduce dummy antenna to 200MMF to reduce hum modulation.
2.	"	"	1620KC	"	"	A5	"
3.		Loop	1500KC	Tune to 1500KC signal	"	A6	Fashion loop of several turns of wire and radiate signal into loop of receiver. Adjust for maximum output.
4.		"	600KC	Tune to 600KC signal	"	A7	Adjust for maximum output while rocking tuning gang.

HOWARD W. SAMS & CO., INC. • Indianapolis 5, Indiana

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PARTS LIST AND DESCRIPTIONS

GENERAL ELECTRIC
Model 660

TUBES (SYLVANIA, GENERAL ELECTRIC, WESTINGHOUSE)

ITEM No.	USE	REPLACEMENT DATA		RETMA BASE TYPE	NOTES
		General Electric PART No.	STANDARD REPLACEMENT		
V1	Converter	1R5	1R5	7AT	
V2	IF Amplifier	1U4	1U4	6AR	
V3	Det.-AVC-AF Amp.	1U5	1U5	6BW	
V4	Audio Output	3V4	3V4	6BX	

ELECTROLYTIC CAPACITORS

ITEM No.	RATING		REPLACEMENT DATA				NOTES
	CAP.	VOLT.	General Electric PART No.	MALLORY PART No.	PYRAMID PART No.	SANGAMO PART No.	
C1A	30	100	RCE-214				Red
B	1000	15					Yellow
C	1000	15					Yellow
C2A	10	100	RCE-213				Red
B	100	3					Yellow

FIXED CAPACITORS

Capacity values given in the rating column are in mfd. for Paper Capacitors, and in mmfd. Mica and Ceramic Capacitors.

ITEM No.	RATING		REPLACEMENT DATA				NOTES
	CAP.	VOLT.	General Electric PART No.	CENTRALAB PART No.	ERIE PART No.	MALLORY PART No.	
C3	.022	200	RCC-123	DF-203	817-02	PT4122	
C4	47		RCW-3075	DD-470	831-470	ZT-5447	
C5	5000		RCW-3014	DD-502	811-005	DC-525	
C6	3000		RCW-3118	DD-302	811-003	UC-523	
C7	2.2		RCN-039	TCZ-2R2	NP0A-2R2		
C8	100		RCW-3079	DD-101	801-101	ZT-531	
C9A	2000		♦RCW-3089	DD-202	801-002	DC-522	
B	200			DD-201	811-201	UC-532	
C	5000			DD-502	811-005	DC-525	
D	4000			DD-402	811-004	UC-524	
C10	2000		RCW-3018	DD-202	801-002		

♦ Items C12A, C12B, C12C, and C12D are combined in one unit.

CONTROLS

ITEM No.	RATING		REPLACEMENT DATA					INSTALLATION NOTES
	RESISTANCE	WATTS	General Electric PART No.	CENTRALAB PART No.	CLAROSTAT PART No.	IRC PART No.	MALLORY PART No.	
R1A	1Meg	½	RRC-322	B-70-S	A47-1Meg-Z	Q13-137	U-53	Volume
B	Shaft		Not Req.	Not Req.	FS-3	Not Req.	Not Req.	Attach to R1A
C	Switch		Not Req.	Not Req.	SWE-12	76-2	US-27	Attach to R1A

RESISTORS

ITEM No.	RATING		REPLACEMENT DATA		NOTES
	OHMS	WATT	General Electric PART No.	IRC PART No.	
R2	100KΩ	½	URD-097	BTS-100K	
R3	10KΩ	½	URD-073	BTS-10K	
R4	27Ω	½	URD-011	BTS-27	
R5	3.3Meg	½	URD-133	BTS-3.3Meg	
R6	3.3Meg	½	URD-133	BTS-3.3Meg	
R7	47Ω	½	URD-017	BTS-47	
R8	10Meg	½	URD-145	BTS-10Meg	
R9	4.7Meg	½	URD-137	BTS-4.7Meg	

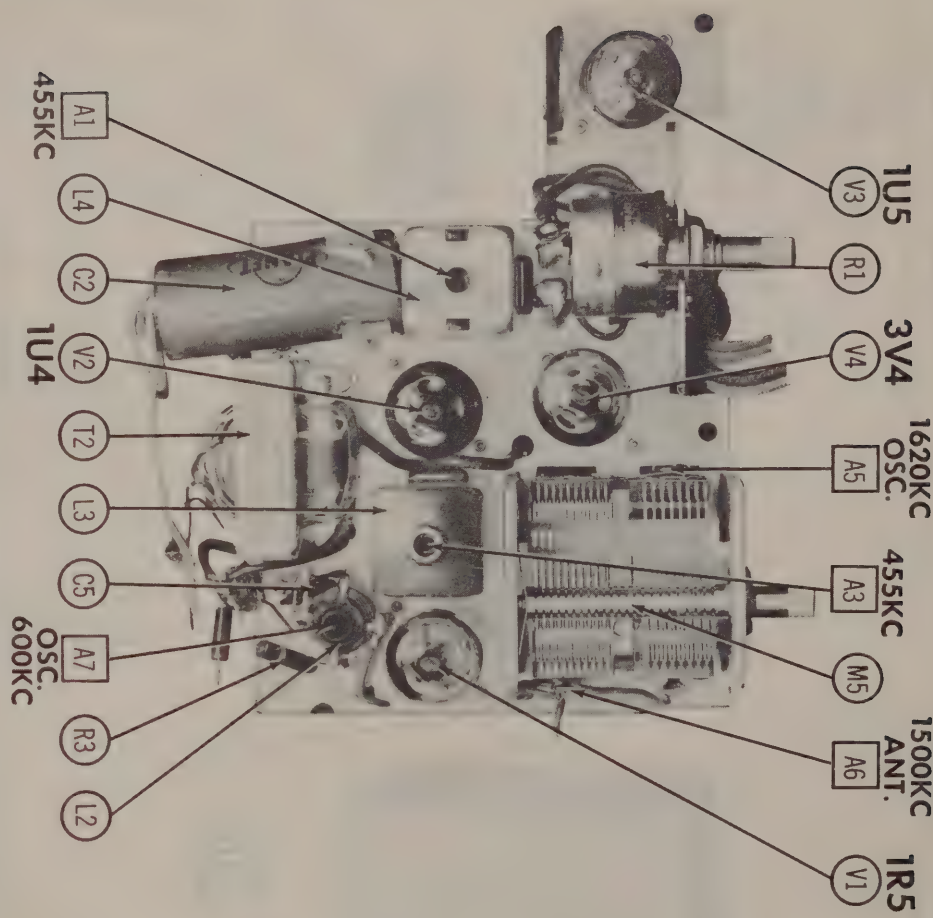
ITEM No.	RATING		REPLACEMENT DATA		NOTES
	OHMS	WATT	General Electric PART No.	IRC PART No.	
R10	1Meg	½	URD-121	BTS-1Meg	
R11	3.3Meg	½	URD-133	BTS-3.3Meg	
R12	390Ω	½	URD-039	BTS-390	
R13	1000Ω	½	URD-049	BTS-1000	
R14	56Ω	2	URF-019		
R15	330Ω	½	URD-037	BTS-330	Note 1
R16	3300Ω	½	URD-061	BTS-3300	
R17	27KΩ	½	URD-083	BTS-47K	

Note 1. Not used in early versions.

TRANSFORMER (POWER)

ITEM No.	RATING				REPLACEMENT DATA					
	PRI.	SEC. 1	SEC. 2	SEC. 3	General Electric PART No.	Halldorson PART No.	Merit PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.
T1	117VAC @ .05A	104VAC .014ADC	23VCT @ .140 ADC		RTP-328					

CHASSIS—TOP VIEW



PARTS LIST AND DESCRIPTIONS (Continued)

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	IMPEDANCE PRI.	IMPEDANCE SEC.	REPLACEMENT DATA General Electric PART No.	Halldorson PART No.	Merit PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.	NOTES
T2	9.1KΩ	3.5Ω	RTO-172		A-2927 ①	A-3329	24S49	S-11X	① Drill one new mounting hole.

SPEAKER

ITEM No.	RATINGS SIZE	RATINGS FIELD	RATINGS V. C. IMP.	REPLACEMENT DATA General Electric PART No.	REPLACEMENT DATA QUAM PART No.	NOTES
SP1	3½"	PM	3.5Ω	ROP-032	3A07	

COILS (RF-IF)

ITEM No.	USE	DC RES. PRI.	DC RES. SEC.	REPLACEMENT DATA General Electric PART No.	MEISSNER PART No.	MERIT PART No.	MILLER PART No.	NOTES
L1	Ant. Coil	.4Ω		RLL-063				
L2	Osc. Coil	1.4Ω	7.2Ω	RLC-129	14-1074	BC-387 *	70-OSC*	
L3	Input IF	38Ω	38Ω	RTL-182	16-6758	BC-352	12-C1	
L4	Output IF	26Ω	26Ω	RTL-182	16-6758	BC-352	12-C2	

* Drill mounting hole.

SELENIUM RECTIFIER

ITEM No.	RATING CURRENT	REPLACEMENT DATA General Electric PART No.	FEDERAL PART No.	INTERNATIONAL PART No.	MALLORY PART No.	RADIO RECEPTOR PART No.	SARKES TARZIAN PART No.	NOTES
M1	.014ADC	RER-011	1263A	RS-050	8S20	8Y1	35	① Use two units
M2	.140ADC	RER-021	1366	A1H ①				

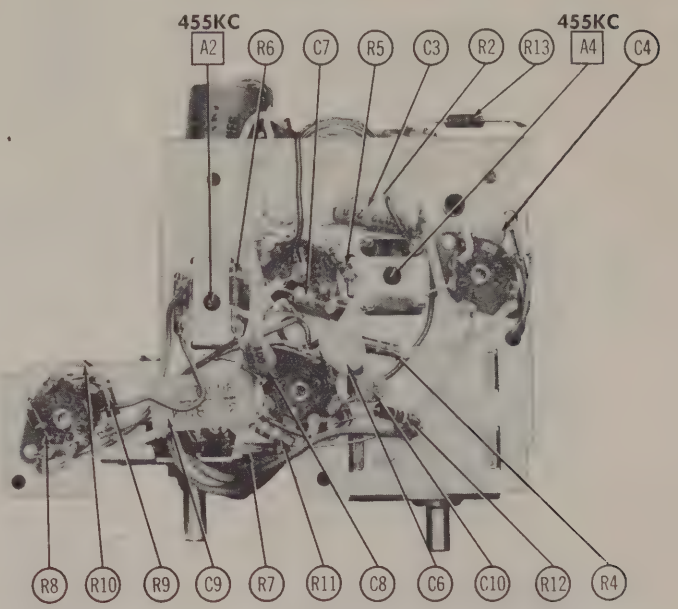
BATTERIES

ITEM No.	VOLTAGE	General Electric PART No.	REPLACEMENT DATA EVEREADY "A"	EVEREADY "B"	EVEREADY "A-B"	BURGESS "A"	BURGESS "B"	BURGESS "A-B"	INSTALLATION NOTES
M3	1.5V "A"		950			2R			Connect 2 in series
M4	67.5V "B"			467			XX45		

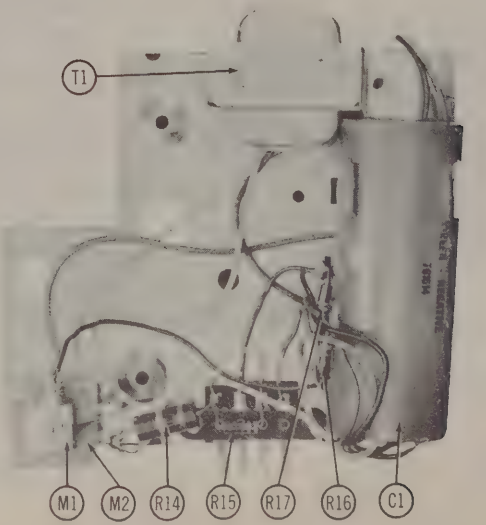
MISCELLANEOUS

ITEM No.	PART NAME	General Electric PART No.	NOTES
M5	Tuning Cap.	RCT-086	2 Gang (21-300MMF, 12-115MMF)
M6	Switch		Power Changeover (Slide Type)
M7	Clock	RZC-046	Model 660
	Clock	RZC-047	Model 661
	Cabinet Back	RAB-264	Clock - Model 660
	Cabinet Back	RAB-265	Clock - Model 661
	Cabinet Front	RAC-158	Clock - Model 660
	Cabinet Front	RAC-159	Clock - Model 661
	Cabinet Back	RAB-266	Radio - Model 660
	Cabinet Back	RAB-267	Radio - Model 661
	Cabinet Front	RAC-160	Radio - Model 660
	Cabinet Front	RAC-161	Radio - Model 661
	Handle	RHY-070	Model 660
	Handle	RHY-071	Model 661
	Knob	RDK-491	On-off-volume - Model 660
	Knob	RDK-492	On-off-volume)- Model 661
	Knob	RDK-493	Tuning - Model 660
	Knob	RDK-494	Tuning - Model 661
	Knob	RZK-029	Clock (3 used) Model 660
	Knob	RZK-030	Clock (3 used) Model 661
	Crystal	RZW-017	Clock
	Contact Board	RJB-064	2 Terminal - For receiver
	Contact Board	RJB-065	4 Terminal - For Clock

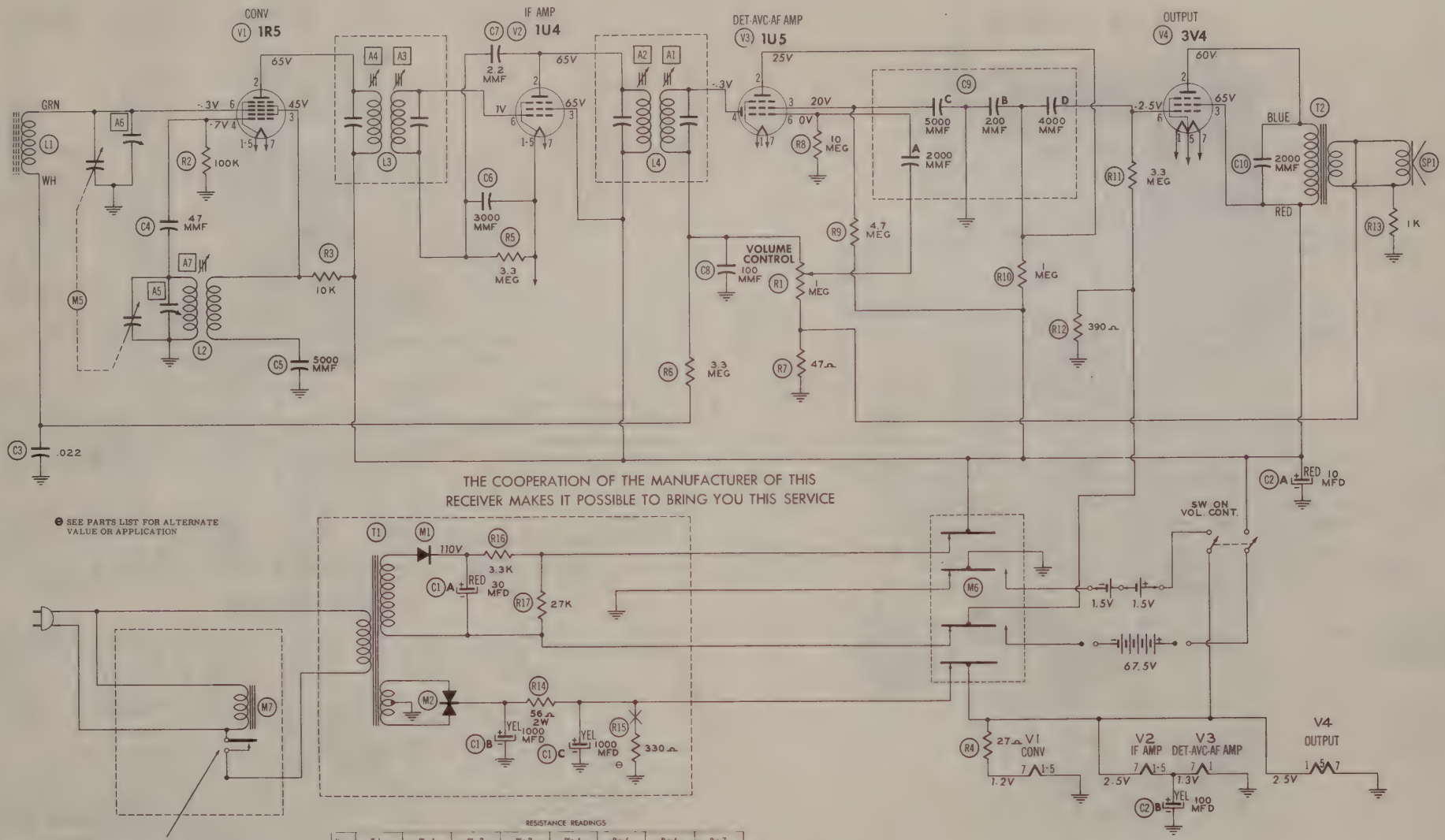
RADIO CHASSIS BOTTOM VIEW



POWER CHASSIS BOTTOM VIEW



GENERAL ELECTRIC
Model 660



THE COOPERATION OF THE MANUFACTURER OF THIS RECEIVER MAKES IT POSSIBLE TO BRING YOU THIS SERVICE

⊖ SEE PARTS LIST FOR ALTERNATE VALUE OR APPLICATION

THROUGH CAMS AND LINKAGES, ONE SW. PERFORMS ALL FUNCTIONS OF OFF, ON, AUTO, AND SLEEP.

RESISTANCE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7
V 1	1R5	0Ω	†3.3KΩ	†13.3KΩ	100KΩ	0Ω	4.3Meg	•
V 2	1U4	•	†3.3KΩ	†3.3KΩ	TP	•	3.3Meg	•
V 3	1U5	0Ω	†1Meg	†4.7Meg	1Meg	TP	10Meg	•
V 4	3V4	•	†3.3KΩ	†3.3KΩ	TP	•	3.3Meg	0Ω

† MEASURED FROM OUTPUT OF M1.
TP - TIE POINT

*DO NOT USE OHMMETER TO MEASURE FILAMENT RESISTANCE.

IF = 455KC

1. DC voltage measurements taken with vacuum tube voltmeter; AC voltages measured at 1000 ohms per volt.
2. Socket connections are shown as bottom views.
3. Measured values are from socket pin to common negative.
4. Line voltage maintained at 117 volts for voltage readings.
5. Nominal tolerance on component values makes possible a variation of ± 15% in voltage and resistance readings.
6. Volume control at maximum, no signal applied for voltage measurements.

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GROMMES
MODEL 60PG

TRADE NAME	Grommes Model 60PG
MANUFACTURER	Precision Electronics, 9101 King Ave., Franklin Park, Ill.
TYPE SET	AC Operated 3 Channel Audio Amplifier
TUBES (Six)	Types: 12AX7 Phono Preamp., 12AX7 AF Amp., 12AX7 AF Amp.-Phase Inv., (2) 5881 Output, 5U4G Rectifier
POWER SUPPLY	110-120 Volts AC-50/60 Cycles
RATING	.88 Amp. @ 117 Volts AC

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PARTS LIST AND DESCRIPTIONS

TUBES (SYLVANIA, GENERAL ELECTRIC, WESTINGHOUSE)

ITEM No.	USE	REPLACEMENT DATA		RETMA BASE TYPE	NOTES
		GROMMES PART No.	STANDARD REPLACEMENT		
V1	Phono Preamp.	12AX7	12AX7	9A	
V2	AF Amp.-Cath. Foll.	12AX7	12AX7	9A	
V3	AF Amp.-Phase Inv.	12AX7	12AX7	9A	
V4	Audio Output	5881	5881	7S	
V5	Audio Output	5881	5881	7S	
V6	Rectifier	5U4G	5U4G	5T	

ELECTROLYTIC CAPACITORS

ITEM No.	RATING		REPLACEMENT DATA				NOTES
	CAP.	VOLT.	GROMMES PART No.	MALLORY PART No.	PYRAMID PART No.	SANGAMO PART No.	
C1A	▲40	450		FP396.1	TM-403020-450	T-160	
B	■20	450					
C	▲20	450					
C2A	■10	250			TM-D10-250	D-105	
B	▲10	250			TD-100-15	MTH-1510	
C	100	15					
C3	50	50		TC39	TD-50-50	FM-0550	
C4	20	25		TC26	TD-25-25	MMT-0220	Note 1

Note 1. Not used in some versions.

FIXED CAPACITORS

Capacity values given in the rating column are in mfd. for Paper Capacitors, and in mmfd. Mica and Ceramic Capacitors.

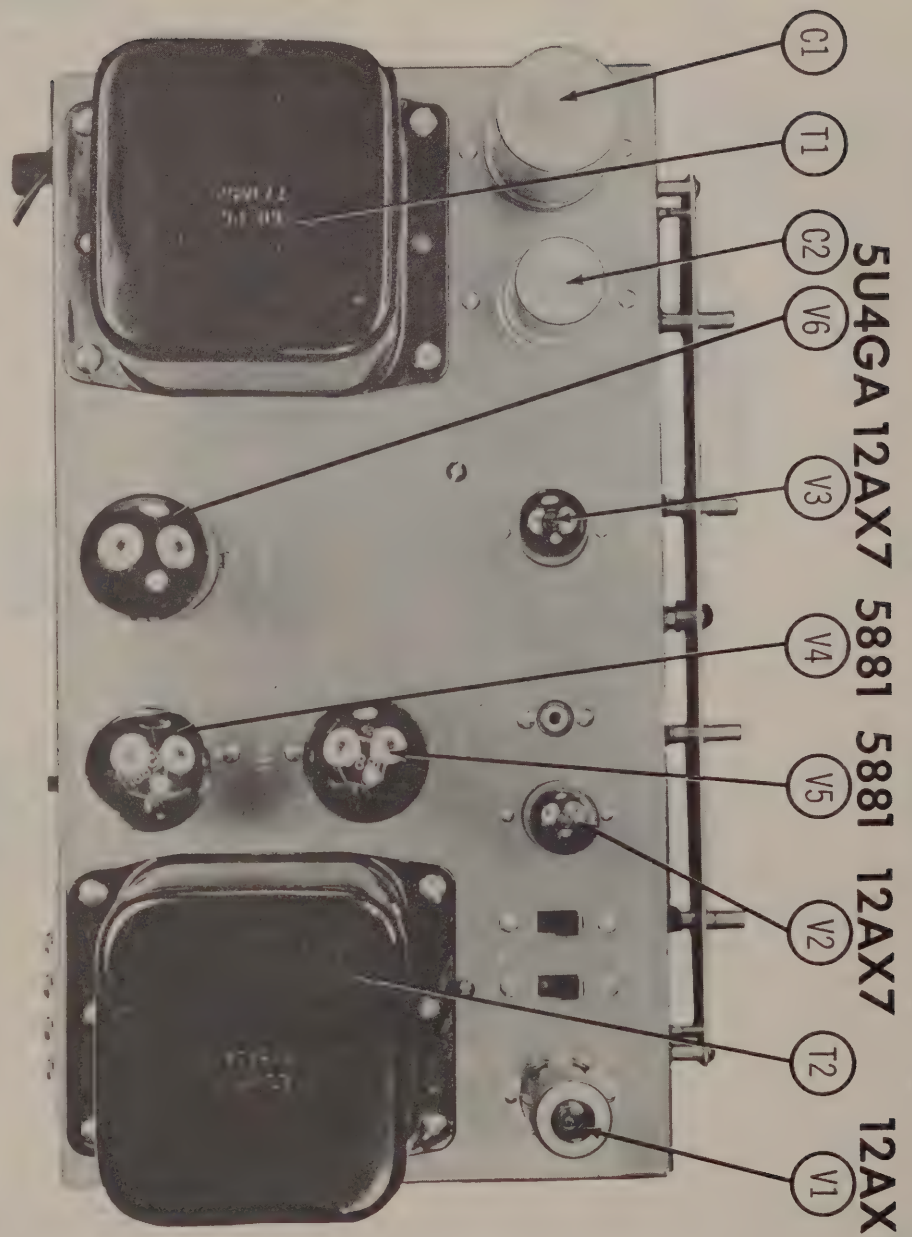
ITEM No.	RATING		REPLACEMENT DATA				NOTES
	CAP.	VOLT.	GROMMES PART No.	CENTRALAB PART No.	ERIE PART No.	MALLORY PART No.	
C5	1000			DD-102	811-102	DC-521	
C6	2000			DD-202	801-002	DC-522	
C7	3000			DD-302	811-003	UC-523	
C8	.01	400		D6-103	811-01	PT411	Note 2
C9	2000			DD-202	801-002	DC-522	
C10	.05	400		DF-503		PT415	
C11	.05	400		DF-503		TC26	
C12	.03	400				PT613	
C13	.05	400		DF-503		PT415	
C14	250	500		D6-251	811-251	MC240	
C15	3000					MCB461	
C16	1000				811-102	MCB255	
C17	.01	400		D6-103	811-01	PT411	
C18	1000				801-001	MCB255	
C19	.05	400		DF-503		PT415	
C20	.05	400		DF-503		PT415	

Note 2. Some versions may use a .03MFD capacitor in this application.

CONTROLS

ITEM No.	RATING		REPLACEMENT DATA					INSTALLATION NOTES
	RESISTANCE	WATTS	GROMMES PART No.	CENTRALAB PART No.	CLAROSTAT PART No.	IRC PART No.	MALLORY PART No.	
R1A	500KΩ	½	W-3182	BT-63-S	AT-88	Q18-133X	UT-429	Volume-Tapped at 50K
B	Shaft		Not Req.	Not Req.	RS-2	Not Req.	Not Req.	Attach to R1A.
C	Switch		Not Req.	Not Req.	SWE-12	76-1	US-26	Attach to R1A.
R2A	1.5Meg	½	W-3181	B-76	A47-2Meg-Z	Q13-139	U-55	Bass
B	Shaft		Not Req.	Not Req.	RS-2	Not Req.	Not Req.	Attach to R2A.
R3A	1.5Meg	½	W-3181	B-76	A47-2Meg-Z	Q13-139	U-55	Treble
B	Shaft		Not Req.	Not Req.	RS-2	Not Req.	Not Req.	Attach to R3A.

CHASSIS—TOP VIEW



PARTS LIST AND DESCRIPTIONS (Continued)

RESISTORS

ITEM No.	RATING		REPLACEMENT DATA		NOTES
	OHMS	WATT	GROMMES PART No.	IRC PART No.	
R4	22KΩ	½		BTS-22K	
R5	22KΩ	½		BTS-22K	
R6	2200Ω 5%	½		BTS-2200 5%	
R7	100KΩ 5%	½		BTS-100K 5%	
R8	100KΩ	½		BTS-100K	
R9	4. 7Meg	½		BTS-4. 7Meg	Note 1
R10	820KΩ	½		BTS-820K	Note 2
R11	1Meg	½		BTS-1Meg	
R12	3. 3Meg	½		BTS-3. 3Meg	
R13	100KΩ	1		BTA-100K	
R14	22KΩ	½		BTS-22K	
R15	1000Ω	½		BTS-1000	
R16	100KΩ	1		BTA-100K	
R17	100KΩ	1		BTA-100K	
R18	47KΩ	½		BTS-47K	
R19	220KΩ	½		BTS-220K	

ITEM No.	RATING		REPLACEMENT DATA		NOTES
	OHMS	WATT	GROMMES PART No.	IRC PART No.	
R20	22KΩ	½		BTS-22K	
R21	22KΩ	½		BTS-22K	
R22	100Ω	½		BTS-100	
R23	1000Ω	½		BTS-1000	
R24	220KΩ	½		BTS-220K	
R25	47KΩ	½		BTS-47K	
R26	220KΩ	½		BTS-220K	
R27	220KΩ	½		BTS-220K	
R28	1000Ω	½		BTS-1000	
R29	400Ω	10		1 3/4A-400	
R30	270KΩ	½		BTS-270K	
R31	1000Ω	½		BTS-1000	
R32	100Ω	1		BTA-100	
R33	100Ω	1		BTA-100	
R34	22KΩ	½		BTS-22K	
R35	5600Ω	2		BTB-5600	

Note 1. Not used in some versions.
Note 2. Some versions use a 1Meg resistor in this application.

TRANSFORMER (POWER)

ITEM No.	RATING				REPLACEMENT DATA					
	PRI.	SEC. 1	SEC. 2	SEC. 3	GROMMES PART No.	Halldorson PART No.	Merit PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.
T1	117VAC @. 88A	730VCT .100ADC	5VAC @3A	6. 3VCT @2. 6A		P9314 ①	P-3153 ①	PC-8411 ①	24R05 ①	R-16A ①

① Drill new mounting holes.

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	IMPEDANCE		REPLACEMENT DATA						NOTES
	PRI.	SEC.	GROMMES PART No.	Halldorson PART No.	Merit PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.	
T2	5.8KΩ CT Tap @ 178Ω CT RES	16Ω Tap @ 8Ω @ 4Ω			A-3101 ①				① Drill new mounting holes.

FILTER CHOKE

ITEM No.	RATINGS			REPLACEMENT DATA					
	TOTAL DIRECT CURRENT	D. C. RESISTANCE	INDUCTANCE (0 CURRENT 1000 ∿)	GROMMES PART No.	Halldorson PART No.	Merit PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.
L1	.100ADC	52Ω	1. 8HY		C5026		C-2325		C-21X

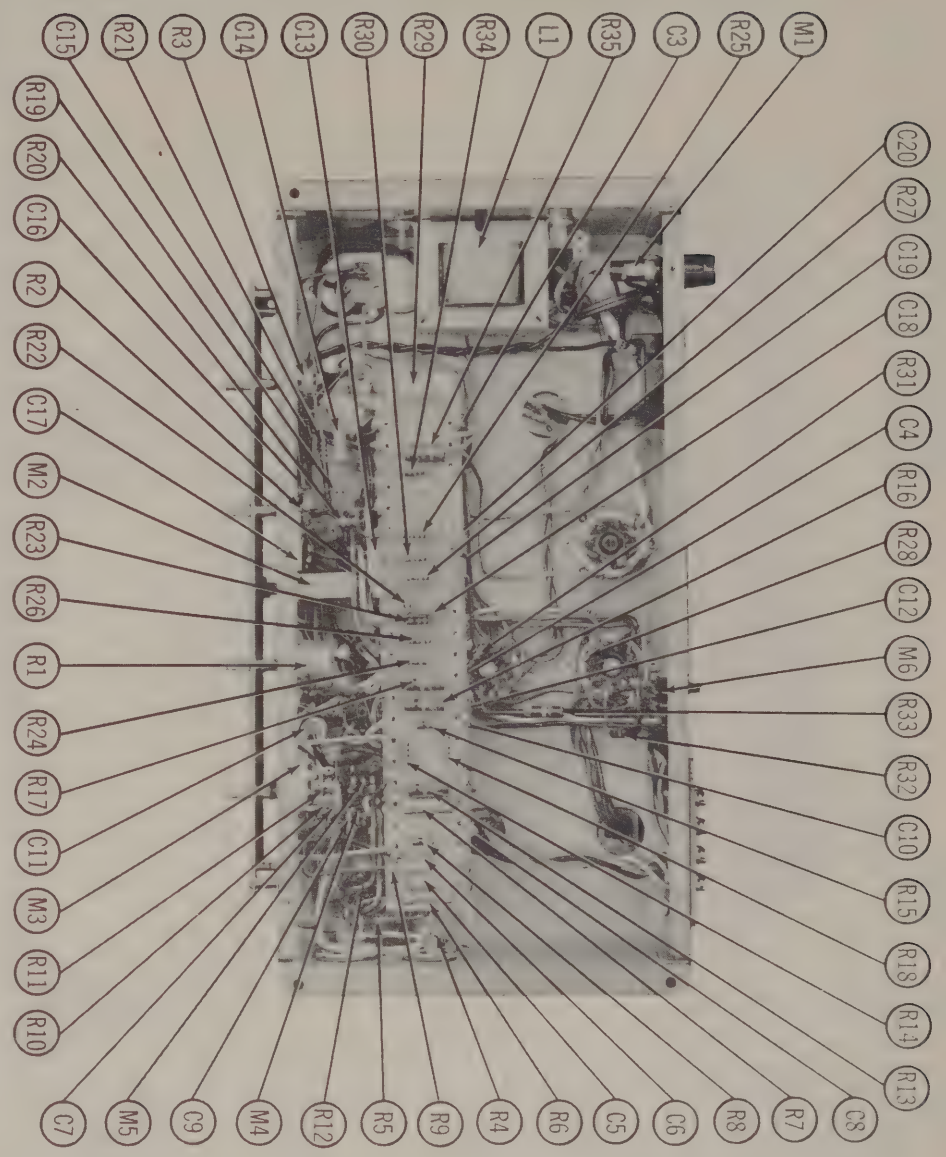
FUSES

ITEM No.	TYPE	RATING	REPLACEMENT DATA					
			GROMMES PART No.		LITTELFUSE PART No.		BUSS PART No.	
			FUSE	HOLDER	FUSE	HOLDER	FUSE	HOLDER
M1	3AG	8A 125V			312008. (3AG 8A)	342001	MTH8	HKP

MISCELLANEOUS

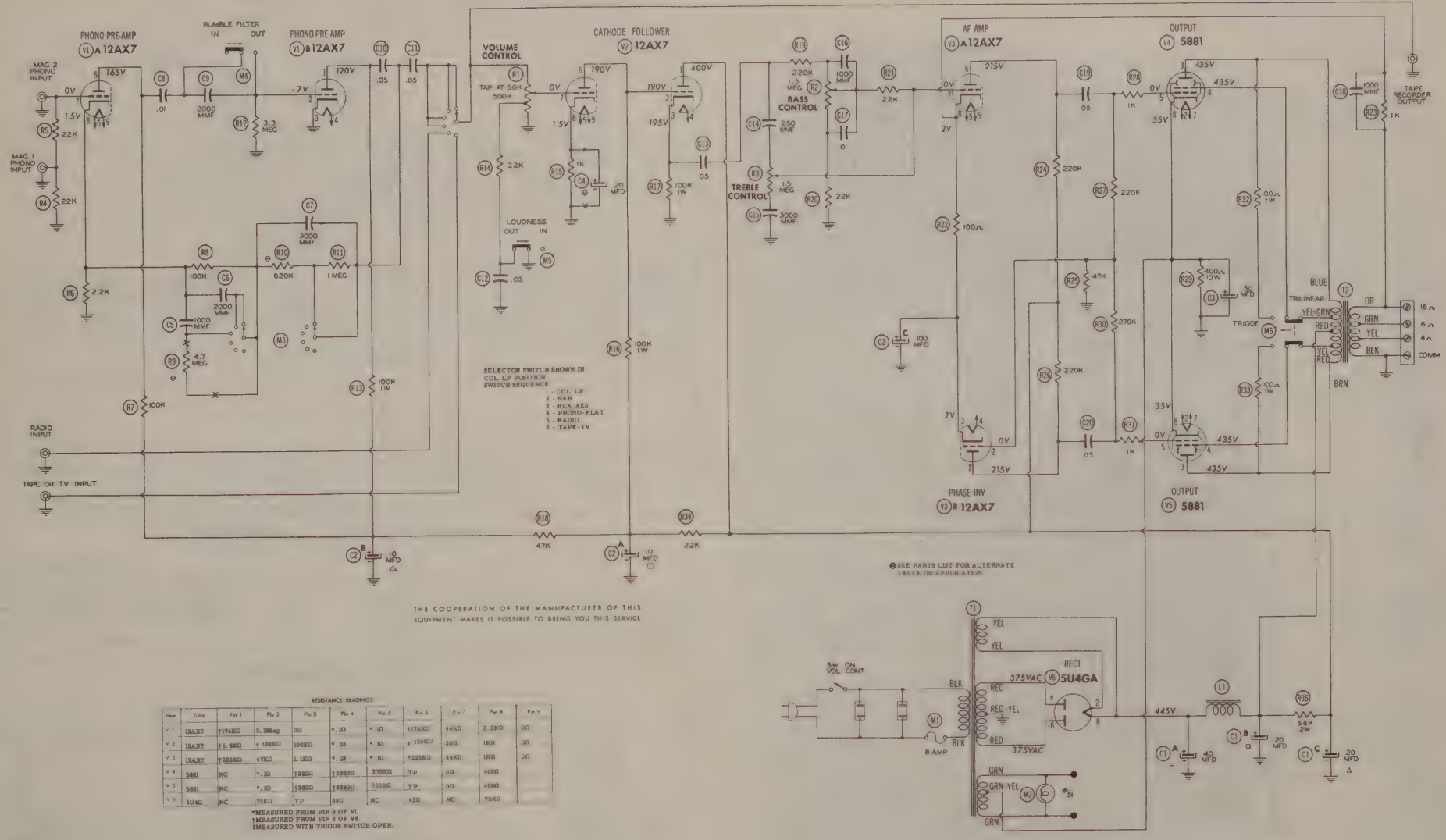
ITEM No.	PART NAME	GROMMES PART No.	NOTES
M2	Pilot Light		#51, Bayonet
M3	Switch		Selector & Compensator (3 Pole- 6 Position)
M4	Switch		Rumble (SPDT-Slide Type)
M5	Switch		Loudness (SPDT-Slide Type)
M6	Switch		Tri-linear -Triode (DPDT-Slide Type)

CHASSIS—BOTTOM VIEW



SET 305 FOLDER 8

GROMMES
Model 60PC



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RESISTANCE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8	Pin 9
V 1	12AX7	†174KΩ	3.2Meg	0Ω	*.1Ω	*.1Ω	†174KΩ	44KΩ	2.2KΩ	0Ω
V 2	12AX7	†5.6KΩ	†138KΩ	100KΩ	*.1Ω	*.1Ω	† 12KΩ	20Ω	1KΩ	0Ω
V 3	12AX7	†238KΩ	47KΩ	1.1KΩ	*.1Ω	*.1Ω	†225KΩ	44KΩ	1KΩ	0Ω
V 4	5881	NC	*.1Ω	†280Ω	†§380Ω	270KΩ	TP	0Ω	400Ω	
V 5	5881	NC	*.1Ω	†280Ω	†§380Ω	320KΩ	TP	0Ω	400Ω	
V 6	5U4G	NC	75KΩ	TP	39Ω	NC	43Ω	NC	75KΩ	

*MEASURED FROM PIN 9 OF V1.
†MEASURED FROM PIN 8 OF V6.
§MEASURED WITH TRIODE SWITCH OPEN.

1. DC voltage measurements taken with vacuum tube voltmeter; AC voltages measured at 1000 ohms per volt.
2. Socket connections are shown as bottom views.
3. Measured values are from socket pin to common negative.
4. Line voltage maintained at 117 volts for voltage readings.
5. Nominal tolerance on component values makes possible a variation of ± 10% in voltage and resistance readings.
6. All controls at minimum, proper output load connected.

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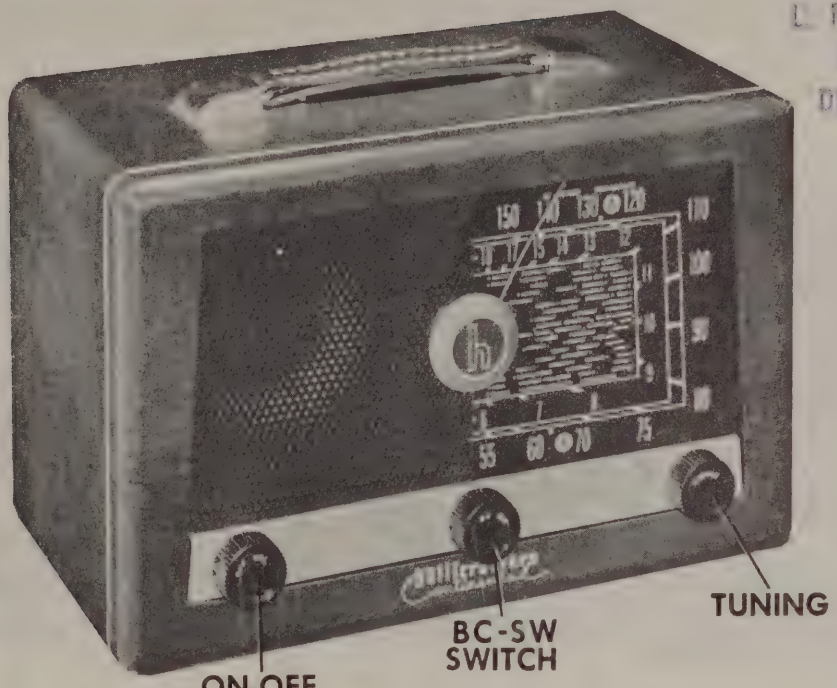
HALLICRAFTERS MODELS
5R40, 5R41, 5R42



HALLICRAFTERS MODELS
5R40, 5R41, 5R42

TRADE NAME	Hallicrafters Models 5R40, 5R41, 5R42 (Runs 1, 2, 3, 4, 4A)
MANUFACTURER	The Hallicrafters Co., 4401 W. 5th. Ave., Chicago 24, Ill.
TYPE SET	Three Power Portable 2 Band AM Superheterodyne Receiver
TUBES (Four)	Types: 1R5 Conv., 1U4 IF Amp., 1U5 Det.-AVC-AF Amp., 3V4 Output
POWER SUPPLY	110-120 Volts AC-DC (or) 7.5 Volts "A" Supply & 90 Volts "B" Supply
RATINGS	.15 Amp. @ 117 Volts AC (or) 50MA @ 7.5 Volts DC & 13.5MA@ 90 Volts DC
TUNING RANGE—BROADCAST	535KC-1620KC SHORT WAVE 5.8MC-18.3MC

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

Use battery power, if possible. If AC power is used, use an isolation transformer when available. If not, connect a .1MFD capacitor in series with low side of the signal generator and B-.
Volume control should be at maximum position. Output of signal generator should be no higher than necessary to obtain an output reading. Use an insulated alignment screwdriver for adjusting.
Loop should be maintained in same relative position to chassis as when receiver is in cabinet.
To set pointer, turn tuning capacitor fully closed and set pointer to last reference mark at low frequency end of dial.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	BAND SWITCH POS.	RADIO DIAL SETTING	OUTPUT METER	ADJUST	REMARKS
1.	.01MFD	High side to green lead on BC antenna. Low side to B-.	455KC (400~Mod)	BC	1000KC	Across voice coil	A1, A2, A3, A4	Adjust for maximum output. IF AC power is used without an isolation transformer, reduce dummy antenna to 200 MMF to reduce hum modulation.
2.	300Ω Carbon Resistor	High side to "A" on sweep antenna terminal. Low side to B-.	14MC	SW	14MC	"	A56, A6	Adjust for maximum output.
3.		Loop (Radiated)	1400KC	BC	1400KC	"	A7, A8	Fashion loop of several turns of wire and radiate signal into loop of receiver. Adjust for maximum output.
4.		"	600KC	BC	600KC	"	A7, A8, A9	"

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PARTS LIST AND DESCRIPTIONS

HALLICRAFTERS
Model 5R40 (Runs 1, 2, 3, 4, 4A)

TUBES (SYLVANIA, GENERAL ELECTRIC, WESTINGHOUSE)

ITEM No.	USE	REPLACEMENT DATA		RETMA BASE TYPE	NOTES
		Hallicrafters PART No.	STANDARD REPLACEMENT		
V1	Converter	1R5	1R5	7AT	
V2	IF Amplifier	1U4	1U4	6AR	
V3	Det.-AVC-AF Amp.	1U5	1U5	6BW	
V4	Audio Output	3V4	3V4	6BX	

ELECTROLYTIC CAPACITORS

ITEM No.	RATING		REPLACEMENT DATA				NOTES
	CAP.	VOLT.	Hallicrafters PART No.	MALLORY PART No.	PYRAMID PART No.	SANGAMO PART No.	
C1A	60	150	45B229	TCD498	TDL-8040-150	MTD-1550	Red
B	40						Green
C2	400	15	45C224	TC1505	TD-500-15	MTH-1550	Note 1

Note 1. In Run 1, C2 is part of C1.

FIXED CAPACITORS

Capacity values given in the rating column are in mfd. for Paper Capacitors, and in mmfd. Mica and Ceramic Capacitors.

ITEM No.	RATING		REPLACEMENT DATA				NOTES
	CAP.	VOLT.	Hallicrafters PART No.	CENTRALAB PART No.	ERIE PART No.	MALLORY PART No.	
C3	.05	400	46AW503J	DF-503		PT415	
C4	15		47X20UK150K	D6-150	831-150		
C5	1.5		47A160-3	TCZ-1R5	NP0A-1R5	ZT-5515	
C6	100		47X25UK101K	TCN-100	N750L-101	NT-531	
C7	5600	500	47X35B562K				
C8	82		47X25UK820K	TCN-82	N750L-820		Note 2
C9	10000		47A224	DD-103	811-01	DC-511	
C10	10000		47A224	DD-103	811-01	DC-511	
C11	1000		47C20A	D6-102	801-001	UC-521	
C12	10000		47A224102M	DD-103	811-01	DC-511	
C13A	150		♦49C022	♦PC-165	811-151	UC-5315	
B	2000				801-002	DC-522	
C	150				811-151	UC-5315	
D	10000				811-01	DC-511	
E	5000				811-005	DC-525	
C14	10000		47A224	DD-103	811-01	DC-511	
C15	.25	200	46AT254J			PT4025	
C16	5000		47A168	DD-502	811-005	DC-525	
C17	.2	600	46AX204H			PT602	

Note 2. Runs 1, 2 & 3 use a 100MMF unit in this application.
♦ Items C13A, C13B, C13C, C13D, C13E, R8A, R8B, R8C and R8D are combined in one unit.

CONTROLS

ITEM No.	RATING		REPLACEMENT DATA					INSTALLATION NOTES
	RESISTANCE	WATTS	Hallicrafters PART No.	CENTRALAB PART No.	CLAROSTAT PART No.	IRC PART No.	MALLORY PART No.	
R1A	1Meg	½	25B1005	BSK-70-S	A47-1Meg-Z	Q13-137	U-53	Volume
B	Shaft		Not Req.	Not Req.	KSS-3	Not Req.	Not Req.	Attach to R1A
C	Switch		Not Req.	Not Req.	SWE-20	76-2	US-27	Attach to R1A

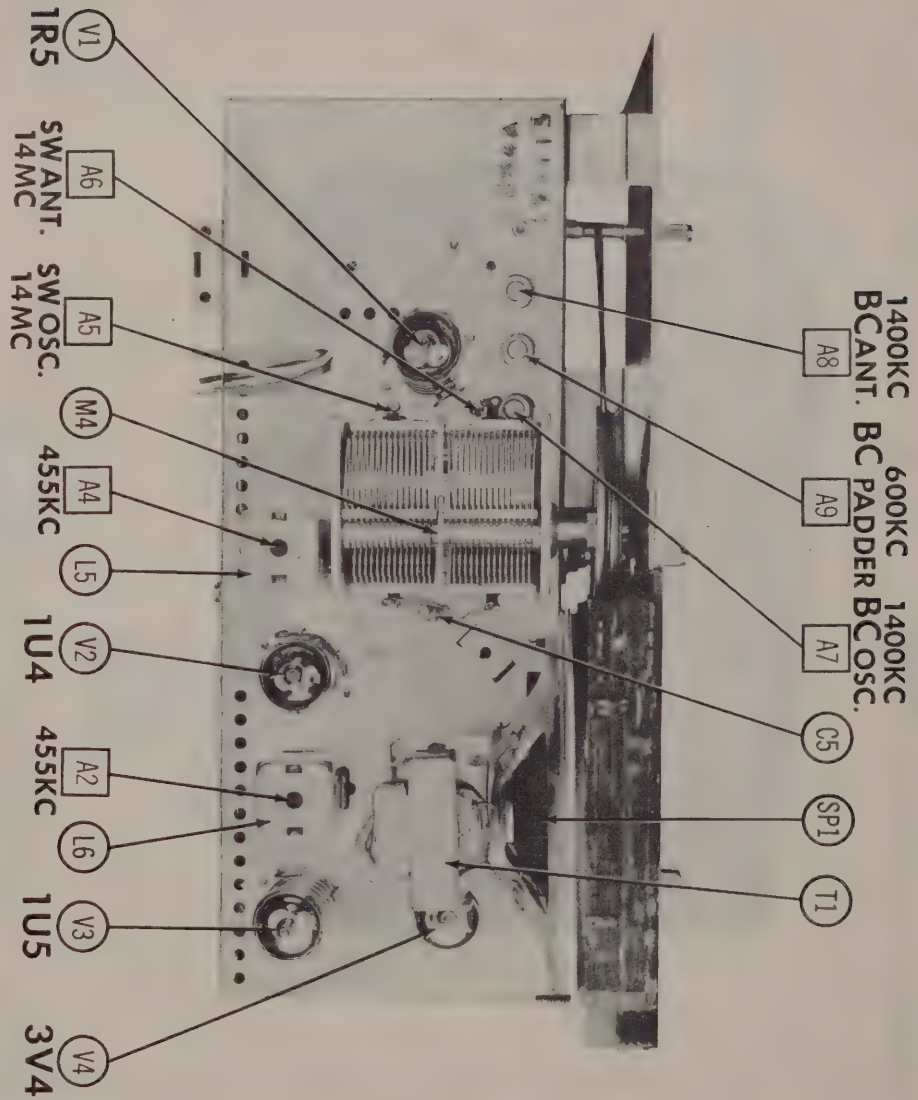
RESISTORS

ITEM No.	RATING		REPLACEMENT DATA		NOTES
	OHMS	WATT	Hallicrafters PART No.	IRC PART No.	
R2	100KΩ	½	23X20X104K	BTS-100K	
R3	2200Ω	½	23X20X222K	BTS-2200	
R4	10KΩ	½	23X20X103K	BTS-10K	Note 1
R5	4.7Meg	½	23X20X475K	BTS-4.7Meg	
R6	2200Ω	½	23X20X222K	BTS-2200	
R7	2.2Meg	½	23X20X225K	BTS-2.2Meg	
R8A	10Meg	½	♦49C022	BTS-10Meg	
B	4.7Meg	½		BTS-4.7Meg	
C	1Meg	½		BTS-1Meg	
D	3.3Meg	½		BTS-3.3Meg	

ITEM No.	RATING		REPLACEMENT DATA		NOTES
	OHMS	WATT	Hallicrafters PART No.	IRC PART No.	
R9	2.2Meg	½	23X20X225K	BTS-2.2Meg	Note 2
R10	1000Ω	½	23X20X102K	BTS-1000	
R11	1000Ω	1½	23X20X102K	BTS-1000	
R12	1500Ω	1½	23X20X152K	BTS-1500	
R13	2400Ω	8	24B938		Note 3
R14	2700Ω	1	23X20X272K	BTA-2700	
R15	47Ω	½	23X20X470K	BTS-47	

♦ Items C13A, C13B, C13C, C13D, C13E, R8A, R8B, R8C, R8D are combined in one unit.
Note 1. Runs 1, 2, &3 use a 18KΩ, ½ watt resistor in this application (Mfgr. part #23X20X103K).
Note 2. Not used in runs 1 and 2.
Note 3. Some versions use a 2700Ω, 8 watt and a 22KΩ, 1 watt resistor connected in parallel.

CHASSIS—TOP VIEW



PARTS LIST AND DESCRIPTIONS (Continued)

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	IMPEDANCE PRI.	IMPEDANCE SEC.	REPLACEMENT DATA: Hallicrafters PART No.	Halldorson PART No.	Merit PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.	NOTES
T1	10KΩ	3Ω	Part of Spkr.	Z1116 ①	A-2998 ①	A-3329 ①	24S49 ①	S-11X ①	① Bend mounting tabs down, file slots, mount on orig. mounting bracket.

SPEAKER

ITEM No.	RATINGS: SIZE	FIELD	V. C. IMP.	REPLACEMENT DATA: Hallicrafters PART No.	QUAM PART No.	NOTES
SP1	4"	PM	3Ω	85C129 85C138 ①	4A07	① Alternate PM speaker

COILS (RF-IF)

ITEM No.	USE	DC RES. PRI.	DC RES. SEC.	REPLACEMENT DATA: Hallicrafters PART No.	MEISSNER PART No.	MERIT PART No.	MILLER PART No.	NOTES
L1	SW Ant. Coil	.4Ω	0Ω	51B1535				
L2	SW Osc. Coil	0Ω	1.1Ω▲	51B1543				▲ Tapped @ .3Ω
L3	BC Ant. Coil	.7Ω		57C181 *				
L4	BC Osc. Coil	1.4Ω	4.6Ω	51B1762 ■	14-1074	BC-394	70-OSC	
L5	Input IF	26Ω	26Ω	50C233	16-6758	BC-352	12-C1	
L6	Output IF	26Ω▲	26Ω	50C516				▲ Tapped @ .7Ω
L7	Fil. Choke	2.2Ω		53A008	19-1006		4624	16.2 Microhenries

* Run 1 uses part #57B167 loop stick. Runs 2 and above use 57C181 (chassis mounted) or 57B175 (cabinet mounted) loop sticks.

■ Alternate part #51B1534 - Run 1 thru Run 3.

SELENIUM RECTIFIER

ITEM No.	RATING: CURRENT	REPLACEMENT DATA: Hallicrafters PART No.	FEDERAL PART No.	INTERNATIONAL PART No.	MALLORY PART No.	RADIO RECEPTOR PART No.	SARKES TARZIAN PART No.	NOTES
M1	.064ADC	27A172	1003A	RS-075	6S75	5M4	75	

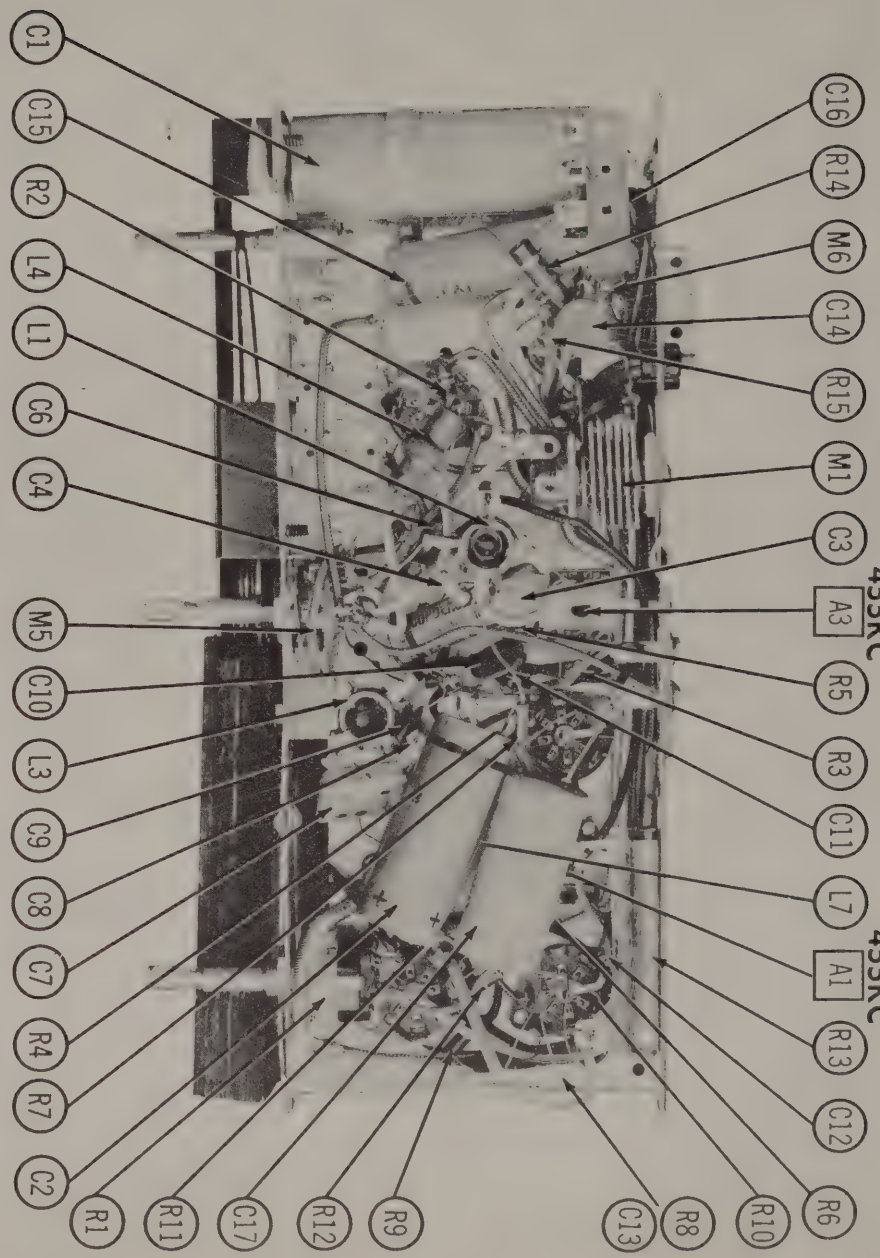
BATTERIES

ITEM No.	VOLTAGE	Hallicrafters PART No.	REPLACEMENT DATA: EVEREADY "A"	EVEREADY "B"	EVEREADY "A-B"	BURGESS "A"	BURGESS "B"	BURGESS "A-B"	INSTALLATION NOTES
M2	7.5V"A"	P13	717			C5			
M3	90V"B"	P231		490			N60		

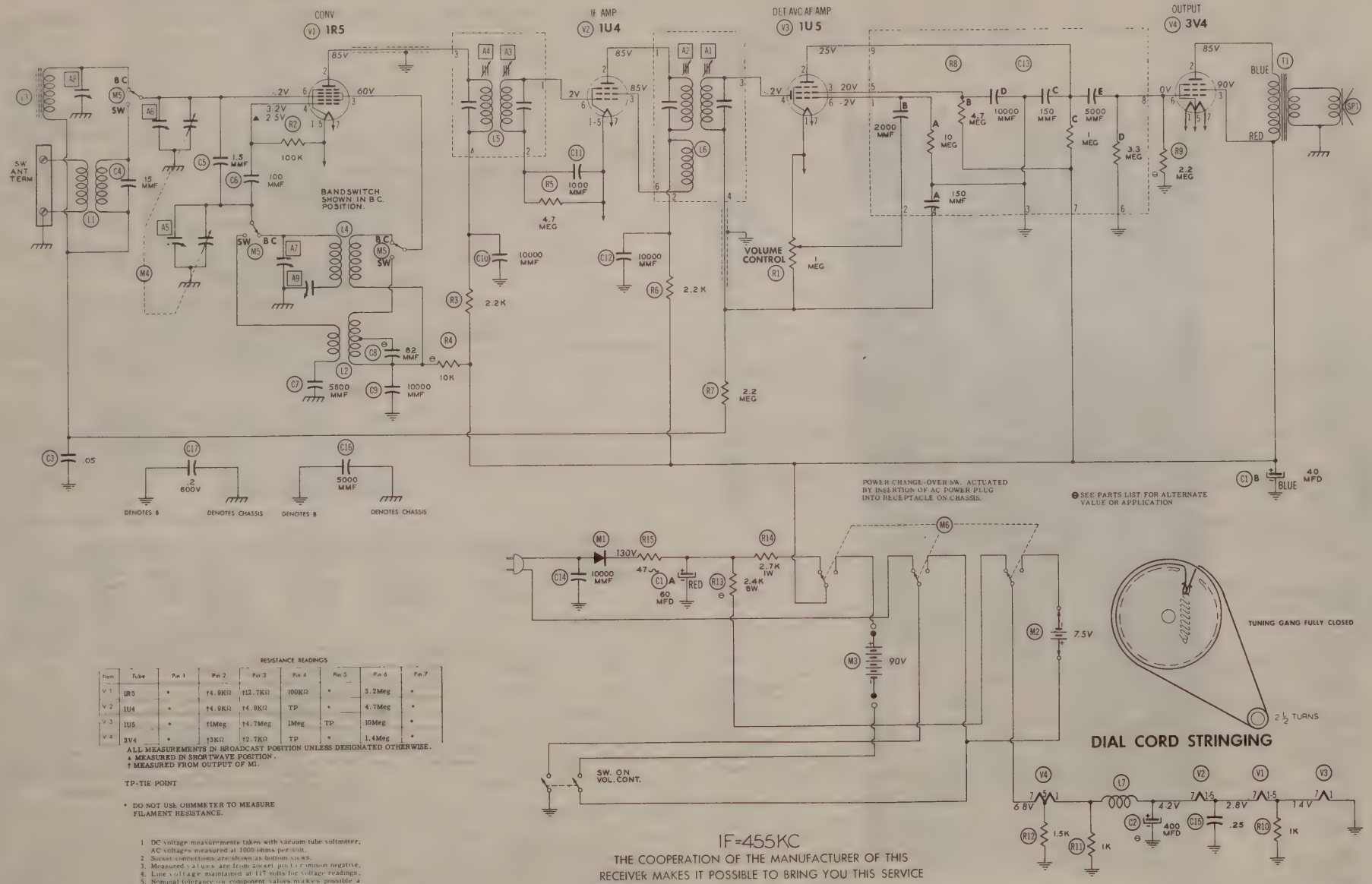
MISCELLANEOUS

ITEM No.	PART NAME	Hallicrafters PART No.	NOTES
M4	Tuning Cap.	48C294	2 Gang (19-490MMF, 19-490MMF)
M5	Switch	60B487	Selector (BC-SW),(3 pole-2 position rotary)
M6	Switch	60B502	Power changeover (3 pole - 2 position -slide type)
	Trimmer Cap.	44C419	3 Sections (BC osc. trimmer, BC osc. padder & BC Ant. trimmer)
	Cabinet	78F854	Less front panel assy.
	Front Panel Assy.	7D379	Model 5R40
	Front Panel Assy.	7A457	Model 5R41
	Front Panel Assy.	7A458	Model 5R42
	Knob	15B525	BC-SW
	Knob	15B529	On-off-volume
	Knob	15B526	Tuning
	Dial Scale	83D418	Model 5R40
	Dial Scale	83A442	Model 5R41
	Dial Scale	83A443	Model 5R42
	Dial Pointer	82A220	

CHASSIS—BOTTOM VIEW



HALLICRAFTERS
Model 5R40 (Runs 1, 2, 3, 4, 4A)



DIAL CORD STRINGING

RESISTANCE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7
V 1	1R5	*	†4.9KΩ	†12.7KΩ	100KΩ	*	3.2Meg	*
V 2	1U4	*	†4.9KΩ	†4.9KΩ	TP	*	4.7Meg	*
V 3	1U5	*	†1Meg	†4.7Meg	1Meg	TP	10Meg	*
V 4	3V4	*	†3KΩ	†2.7KΩ	TP	*	1.4Meg	*

ALL MEASUREMENTS IN BROADCAST POSITION UNLESS DESIGNATED OTHERWISE.
▲ MEASURED IN SHORTWAVE POSITION.
† MEASURED FROM OUTPUT OF M1.

TP-TIE POINT

* DO NOT USE OHMMETER TO MEASURE FILAMENT RESISTANCE.

1. DC voltage measurements taken with vacuum tube voltmeter.
2. AC voltages measured at 1000 ohms per volt.
3. Socket connections are shown as bottom views.
4. Measured values are from socket pin to common negative.
5. Line voltage maintained at 117 volts for voltage readings.
6. Nominal tolerance on component values makes possible a variation of ± 10% in voltage and resistance readings.
7. Volume control at maximum, no signal applied for voltage measurements

IF=455KC

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HALLICRAFTERS MODEL 17T101M

TRADE NAME	Hallicrafters	MODELS	CHASSIS
		17T100B, 17T100M	A1300D
		17T101B, 17T101M	B1300D
		17K110B, 17K110M	C1300D
		17K111B, 17K111M	D1300D
		21K140B, 21K140M, 21T120B, 21T120M	E1300D
		21K141B, 21K141M, 12T121B, 21T121M	F1300D
		17T171B, 17T171M, 21K151M, 21T161B, 21T161M	H1300D
		17T170B, 17T170M, 21K150M, 21T160B, 21T160M	J1300D
MANUFACTURER	Hallicrafters Co., 4401 W. 5th. Ave., Chicago 24, Illinois		
TYPE SET	Television Receiver		
TUBES	Twenty		
POWER SUPPLY	110-120 Volts AC-60 Cycles	RATING 1.26 Amp. @ 117 Volts AC	
TUNING RANGE	Channels 2 thru 13 VHF, 14 thru 83 UHF, Video IF 45.75MC, Sound IF 41.25MC (Intercarrier)		

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HALLICRAFTERS MODELS 17K110B, M, 17K111B, M, 17T100B, M, 17T101B, M, 17T170B, M, 17T171B, M, 21K140B, M, 21K141B, M, 21K150M, 21K151M, 21T120B, M, 21T121B, M, 21T160B, M, 21T161B, M (Ch. A1300D, B1300D, C1300D, D1300D, E1300D, F1300D, H1300D, J1300D)

CHASSIS

A1300D, B1300D, C1300D, D1300D,
E1300D, F1300D, H1300D, J1300D

DISASSEMBLY INSTRUCTIONS

CHASSIS REMOVAL

1. Remove 5 push-on type control knobs from front panel of cabinet.
2. Disconnect antenna plugs, knob from range control, remove 7 wood screws and 1 metal screw. Remove rear cover .
3. Disconnect speaker plug.
4. Remove picture tube brace from inside top of cabinet.
5. Remove 4 chassis bolts. Remove chassis.
6. Remove 2 speaker nuts. Remove speaker.

SERVICING IN THE FIELD

TUNER OSCILLATOR ADJUSTMENTS

Touch-up adjustments of the VHF tuner oscillator circuit may be accomplished by removing the channel selector and fine tuning knobs.

PICTURE TUBE SAFETY GLASS CLEANING

To clean safety glass remove 3 metal screws holding metal strip at the top edge of the safety glass. Remove metal strip and safety glass. Use extreme caution when removing safety glass.

PICTURE TUBE REMOVAL

For picture tube safety glass cleaning, it is necessary to remove chassis. (See disassembly instructions).

SERVICE ADJUSTMENT LOCATION

See tube placement chart on page 11.

HORIZONTAL OSCILLATOR FIELD ADJUSTMENT

For adjustment of the horizontal oscillator, it is necessary to remove the rear cover and supply power to the set. Adjustment is located on top of chassis. Set the horizontal hold control at the center of its range and adjust the horizontal oscillator coil (L45) until the picture synchronizes horizontally.

SOUND IF DETECTOR BUZZ ADJUSTMENT

To eliminate sound IF detector buzz, adjust the ratio detector secondary (L44) located on top of chassis.

CENTERING

Centering is accomplished mechanically by adjusting two magnetic rings around the neck of the picture tube, located flush against the deflection yoke. Rotate the two rings around the neck of the tube until the picture is properly centered.

HOWARD W. SAMS & CO., INC. • Indianapolis 5, Indiana

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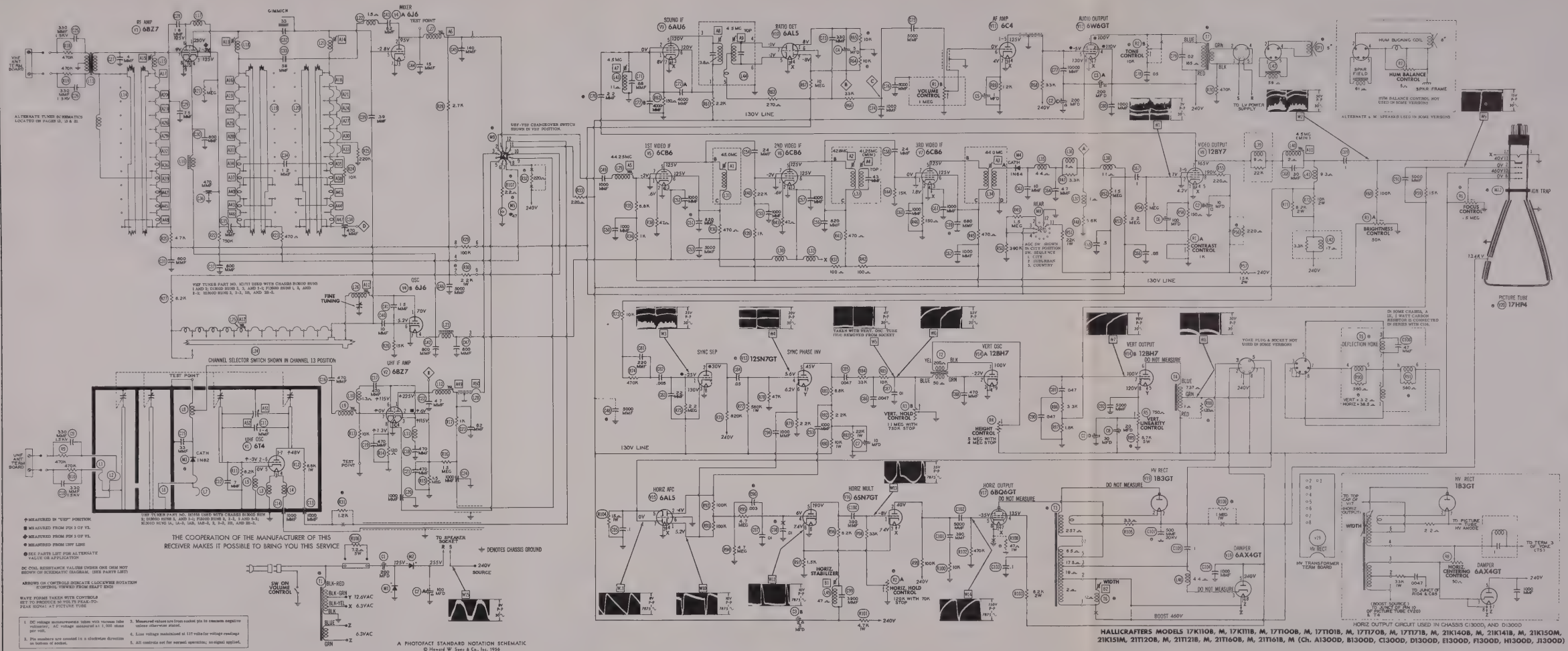
DATE 2-56 SET 305 FOLDER 10


RF AMP V3 6BZ7
MIXER A 6J6 TEST POINT
SOUND IF V5 6AU6
RATIO DET V10 6AL5
AF AMP V11 6C4
AUDIO OUTPUT V12 6W6GT
1ST VIDEO IF V5 6CB6
2ND VIDEO IF V6 6CB6
3RD VIDEO IF V7 6CB6
VIDEO OUTPUT V8 12BY7
OSC V9 6J6
UHF IF AMP V2 6BZ7
UHF OSC V1 6T4
SYNC SEP V13 12SN7GT
SYNC PHASE INV
VERT OSC V16 A 12BH7
VERT OUTPUT V16 B 12BH7
HORIZ AFC V15 6AL5
HORIZ MULT V19 6SN7GT
HORIZ OUTPUT V17 6BQ6GT
HV RECT V18 1B3GT
DAMPER V19 6AX4GT
PICTURE TUBE V20 17HP4
130V LINE
CHANNEL SELECTOR SWITCH SHOWN IN CHANNEL 13 POSITION
TEST POINT
FINE TUNING
VOLUME CONTROL
TONE CONTROL
HUM BALANCE CONTROL
FOCUS CONTROL
BRIGHTNESS CONTROL
CONTRAST CONTROL
VERT LINEARITY CONTROL
VERT. HOLD CONTROL
HEIGHT CONTROL
HORIZ. STABILIZER
HORIZ. HOLD CONTROL
HORIZ. CENTERING CONTROL
WIDTH
ION TRAP
DEFLECTION YOKE
TO SPEAKER SOCKET
TO LV POWER SUPPLY
DO NOT MEASURE
BOOST 460V
13.4KV
ALTERNATE TUNER SCHEMATICS LOCATED ON PAGES 11, 13 & 21
VHF TUNER PART NO. 51111 USED WITH CHASSIS B1300D SUFFIXES 1 AND 3; D1300D SUFFIXES 2, 3, AND 5-1; F1300D SUFFIX L, A, AND 2-2; H1300D SUFFIXES 2, 3-2, 3S, AND 3S-2.
UHF TUNER PART NO. 51184 USED WITH CHASSIS B1300D SUFFIXES 2; D1300D SUFFIXES 3, AND 5-1; F1300D SUFFIXES 2, 2-2, 3 AND 5-2; H1300D SUFFIXES 1A, 1A-2, 1AS, 1AS-2, 2, 2-2, 2S, AND 2S-2.
THE COOPERATION OF THE MANUFACTURER OF THIS RECEIVER MAKES IT POSSIBLE TO BRING YOU THIS SERVICE
DENOTES CHASSIS GROUND
240V SOURCE
SW ON VOLUME CONTROL
BLK-RED
BLK-GRN
BLK-YEL
BLK
BLUE
GRN
12.6VAC
6.3VAC
6.3VAC
MEASURED IN "UHF" POSITION
MEASURED FROM PIN 3 OF V5.
MEASURED FROM PIN 5 OF V5.
MEASURED FROM 120V LINE
SEE PARTS LIST FOR ALTERNATE VALUE OR APPLICATION
DC COIL RESISTANCE VALUES UNDER ONE OHM NOT SHOWN ON SCHEMATIC DIAGRAM. (SEE PARTS LIST)
ARROWS ON CONTROLS INDICATE CLOCKWISE ROTATION (CONTROL VIEWED FROM SHAFT END)
WAVE FORMS TAKEN WITH CONTROLS SET TO PRODUCE 80 VOLTS PEAK-TO-PEAK SIGNAL AT PICTURE TUBE
1. DC voltage measurements taken with vacuum tube voltmeter; AC voltage measured at 1,000 ohms per volt.
2. Pin numbers are counted in a clockwise direction as bottom of socket.
3. Measured values are from socket pin to common negative unless otherwise stated.
4. Line voltage maintained at 117 volts for voltage readings
5. All controls set for normal operation; no signal applied.
A PHOTOFACT STANDARD NOTATION SCHEMATIC
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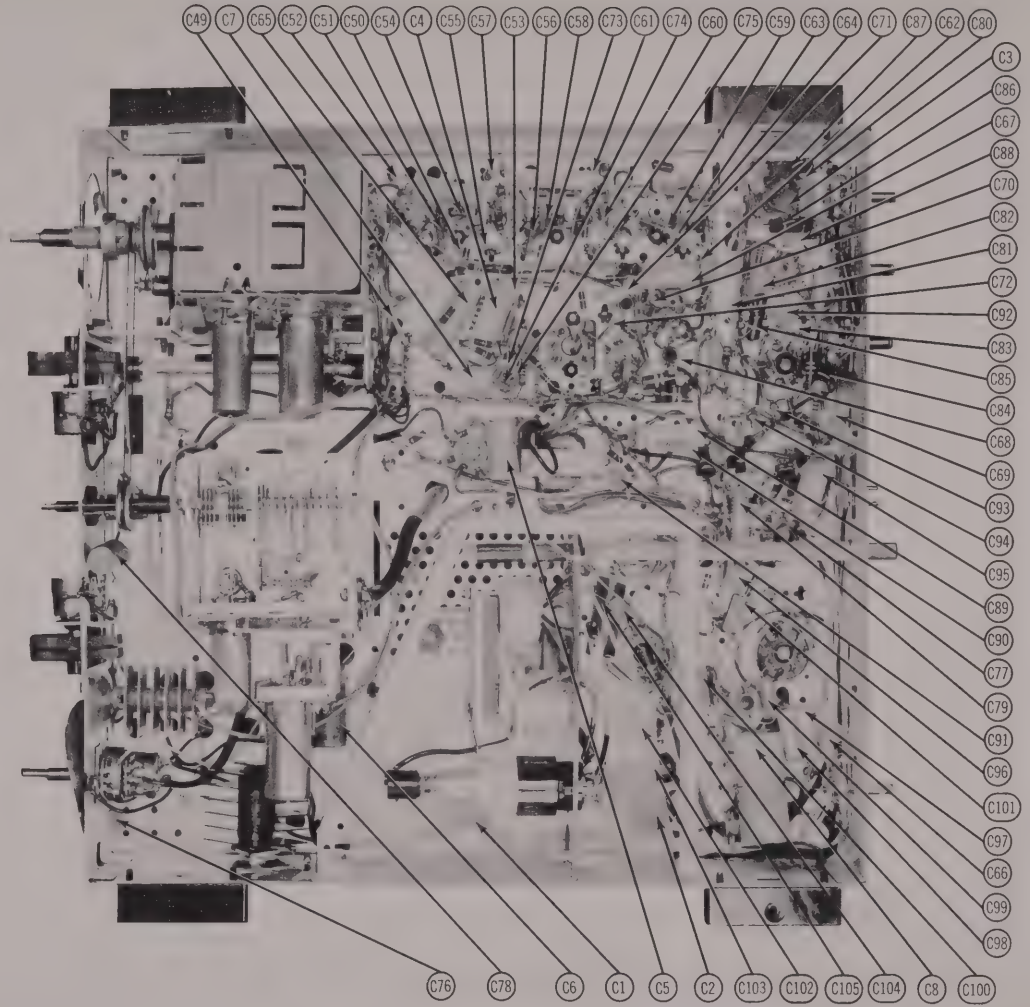
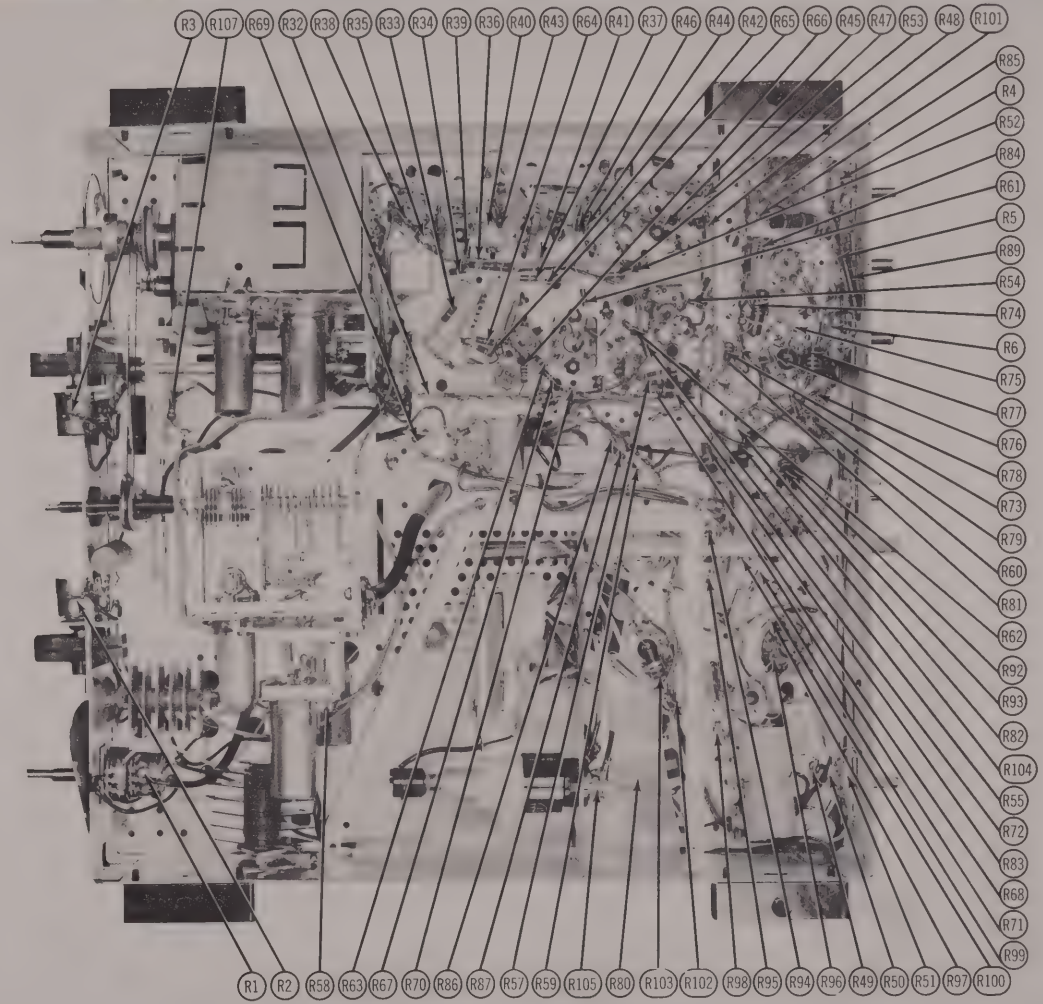
HORIZ OUTPUT CIRCUIT USED IN CHASSIS C1300D, AND D1300D

HALLICRAFTERS MODELS 17K110B, M, 17K111B, M, 17T100B, M, 17T101B, M, 17T170B, M, 17T171B, M, 21K140B, M, 21K141B, M, 21K150M, 21K151M, 21T120B, M, 21T121B, M, 21T160B, M, 21T161B, M (Ch. A1300D, B1300D, C1300D, D1300D, E1300D, F1300D, H1300D, J1300D)



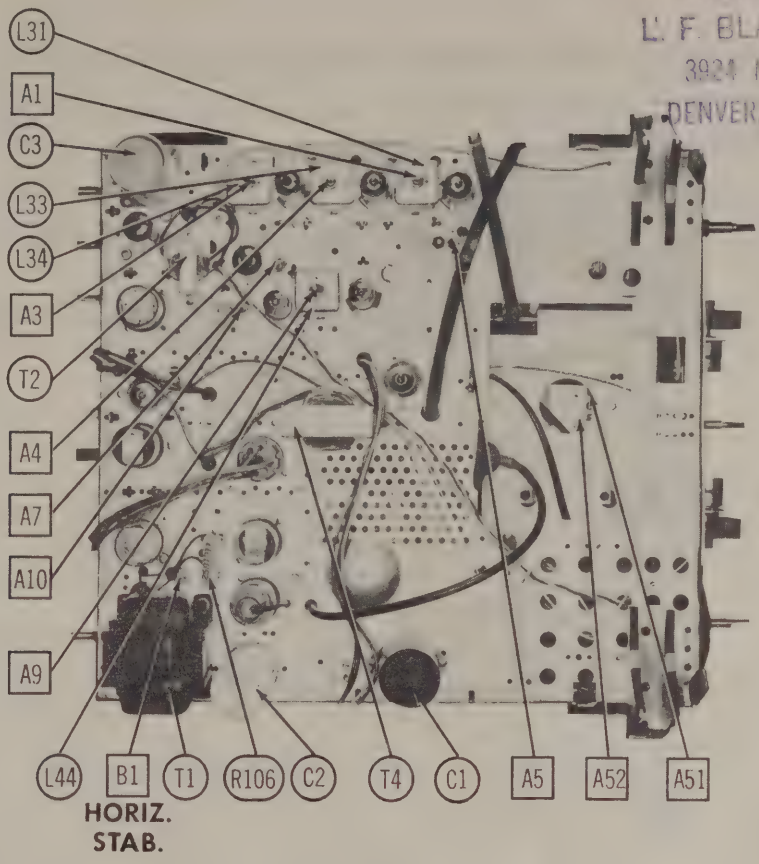
CHASSIS BOTTOM VIEW-CAPACITOR IDENTIFICATION

PROPERTY OF
L. F. BLANKENSHIP
3924 MEADE ST.
DENVER, COLORADO

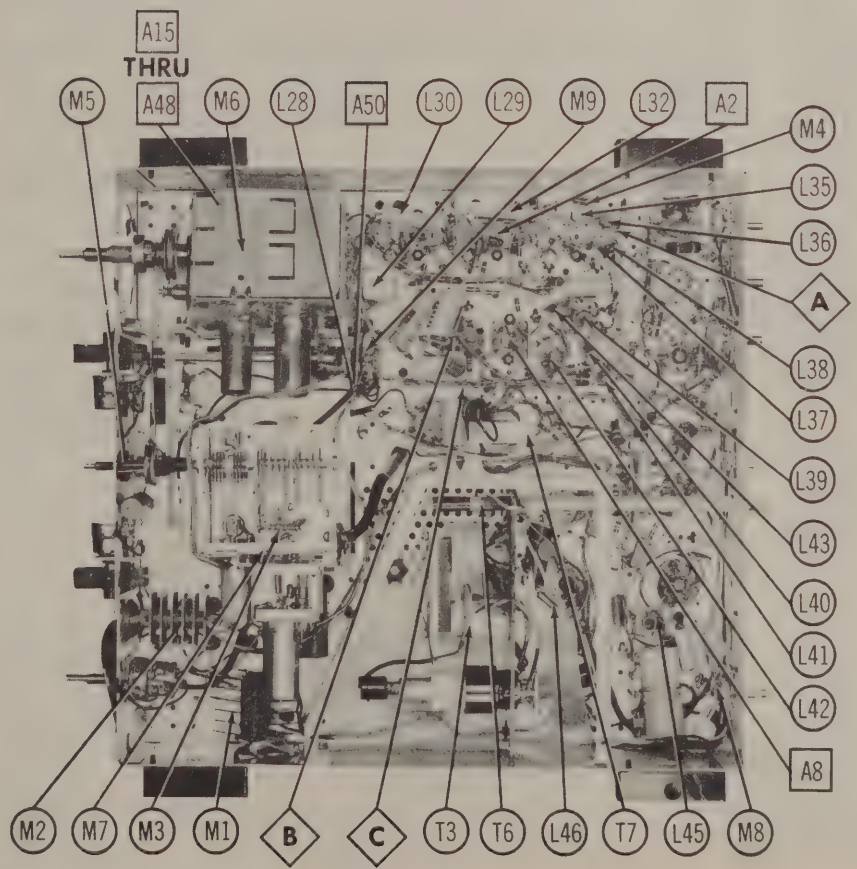


CHASSIS BOTTOM VIEW-RESISTOR IDENTIFICATION

PROPERTY OF
L. F. BLANKENSHIP
3924 MEADE ST.
DENVER, COLORADO



CHASSIS TOP VIEW



CHASSIS BOTTOM VIEW-TRANS., INDUCTOR AND ALIGNMENT IDENTIFICATION

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

The high voltage lead should be securely taped and kept away from chassis. Do not remove the horizontal multivibrator tube (V16) to disable the high voltage.
Allow a 15 minute period for receiver and test equipment to warm up.
Where alignment requires the adjustment of cores which have been sealed by wax, this wax can be softened by means of a heated screw driver or small pencil type soldering iron. After adjustment the cores should be resealed.
Use an isolation transformer to protect the test equipment.

VIDEO IF ALIGNMENT

Set the AVC switch at the 0-10 mile position (fully counter clockwise).
Connect the negative lead of a 3 volt battery thru a 1KΩ resistor to the ungrounded side of C65. Connect the positive lead to chassis.
Remove the converter tube (V4) and replace with a 6J6 which has pin 1 removed. This will disable the local oscillator and reduce the possibility of erroneous indications. Note: On chassis using VHF tuner IE1718, set the channel selector between any two channels to disable the local oscillator.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	CHANNEL	CONNECT VTVM	ADJUST	REMARKS
1.	Direct	High side to an ungrounded tube shield floating over converter tube (V4). Low side to chassis.	45.0MC (Unmod.)	Any	DC probe thru 47KΩ to point (A). Low side to chassis.	A1	Adjust for maximum deflection. Attenuate generator output to maintain approximately 2 volts at VTVM.
2.	"	"	42.8MC	"	"	A2	"
3.	"	"	44.0MC	"	"	A3	"
4.	"	"	41.25MC	"	"	A4	Adjust for MINIMUM deflection.
5.	"	"	42.8MC	"	"	A2	Recheck for maximum deflection.
6.	"	"	44.25MC	"	"	A5	On chassis using VHF tuners IE1718 and 1C1717 connect A470Ω resistor in series with .01MFD capacitor from pin 2 (plate) of 6J6 (V4) to chassis. This point is accessible as a test point on top of tuner. Adjust A5 for maximum deflection. Remove the 470Ω resistor and .01MFD capacitor.
7.	"	"	"	"	"	A6	Connect a 470Ω resistor in series with .01MFD capacitor from pin 1 (grid) of V5 to chassis. Adjust A6 for maximum deflection. Remove the 470Ω resistor and .01MFD capacitor.

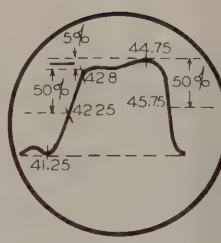


FIG. 1

OVERALL VIDEO IF RESPONSE CHECK

Use only enough sweep generator output for useable pattern on scope. If sweep generator has no built in marker, couple marker generator loosely to sweep generator output.
Leave bias connected as under "Video IF Alignment".
Connect the synchronized sweep voltage from the sweep generator to the horizontal input of the oscilloscope for horizontal deflection.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
8.	Direct	High side to an ungrounded tube shield floating over converter tube (V4). Low side to chassis.	44MC (10MC Swp.)	41.25MC 42.25MC 42.8MC 44.75MC 45.75MC	Any	Vert. Amp. thru 47KΩ to point (A). Low side to chassis.		Check for response similar to Fig. 1. Response curve should be slightly tilted as shown, to compensate for the capacitor coupling of the sweep generator. If necessary retouch A1, A2, A3 for desired response. A1 affects the 45.75MC marker placement. A2 affects the slope between 41.25MC and 42.8MC and the placement of 42.25MC marker. A3 affects principally the tilt.

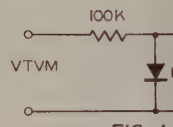


FIG. 4

SOUND IF ALIGNMENT USING AM SIGNAL GENERATOR AND VTVM

Set contrast control to minimum.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	CHANNEL	CONNECT VTVM	ADJUST	REMARKS
9.	.005MFD	High side to point (A). Low side to chassis.	4.5MC (Unmod.)	Any	DC probe to point (B). Common to chassis.	A7, A8	Adjust for maximum deflection.
10.	"	"	"	"	DC probe to point (C). Common to chassis.	A9	Adjust for zero reading. A positive and negative reading will be obtained on either side of the correct setting.

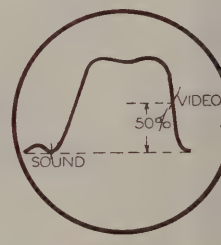
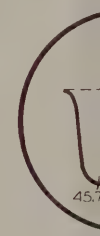


FIG. 5

SOUND IF ALIGNMENT USING FM SIGNAL GENERATOR AND OSCILLOSCOPE

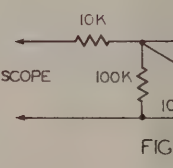
Set contrast control to minimum.
Use frequency modulated signal with 60% modulation and 450KC sweep. Use 120% sawtooth voltage in scope for horizontal deflection.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
9.	.005MFD	High side to point (A). Low side to chassis.	4.5MC (450KC Swp.)	4.5MC	Any	Vert. Amp. to point (B). Low side to chassis.	A7, A8	Disconnect stabilizer capacitor C4. Adjust for curve of maximum amplitude and symmetry as in Fig. 2.
10.	"	"	"	"	"	Vert. Amp. to point (C). Low side to chassis.	A9	Reconnect C4. Adjust so that 4.5MC occurs at center of crossover lines as in Fig. 3. SLIGHTLY retouch A8 for maximum amplitude and straightness of crossover lines.



4.5MC TRAP ALIGNMENT

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	CHANNEL	CONNECT VTVM	ADJUST	REMARKS
11.	.005MFD	High side to point (A). Low side to chassis.	4.5MC (Unmod.)	Any	DC probe thru detector (Fig. 4) to pin 11 of picture tube. Common to chassis.	A10	Adjust for MINIMUM deflection.



FIG

ALIGNMENT INSTRUCTIONS

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

The high voltage lead should be securely taped and kept away from chassis. Do not remove the horizontal multivibrator tube (V18) to disable the high voltage.
Allow a 15 minute period for receiver and test equipment to warm up.
Where alignment requires the adjustment of cores which have been sealed by wax, this wax can be softened by means of a heated screw driver or small pencil type soldering iron. After adjustment the cores should be resealed.
Use an isolation transformer to protect the test equipment.

VIDEO IF ALIGNMENT

Set the AVC switch at the 0-10 mile position (fully counter clockwise).
Connect the negative lead of a 3 volt battery thru a 1KΩ resistor to the ungrounded side of C85. Connect the positive lead to chassis.
Remove the converter tube (V4) and replace with a 6J6 which has pin 1 removed. This will disable the local oscillator and reduce the possibility of erroneous indications. Note: On chassis using VHF tuner IE1718, set the channel selector between any two channels to disable the local oscillator.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	CHANNEL	CONNECT VTVM	ADJUST	REMARKS
1.	Direct	High side to an ungrounded tube shield floating over converter tube (V4). Low side to chassis.	45.9MC (Unmod.)	Any	DC probe thru 47KΩ to point Ⓐ. Low side to chassis.	A1	Adjust for maximum deflection. Attenuate generator output to maintain approximately 3 volts at VTVM.
2.	"	"	42.8MC	"	"	A3	"
3.	"	"	44.0MC	"	"	A3	"
4.	"	"	41.25MC	"	"	A4	Adjust for MINIMUM deflection.
5.	"	"	42.8MC	"	"	A3	Recheck for maximum deflection.
6.	"	"	44.25MC	"	"	A5	On chassis using VHF tuners IE1718 and IC1717 connect A470Ω resistor in series with .01MFD capacitor from pin 2 (plate) of 6J6 (V4) to chassis. This point is accessible as a test point on top of tuner. Adjust A5 for maximum deflection. Remove the 470Ω resistor and .01MFD capacitor.
7.	"	"	"	"	"	A6	Connect a 470Ω resistor in series with .01MFD capacitor from pin 1 (grid) of V3 to chassis. Adjust A6 for maximum deflection. Remove the 470Ω resistor and .01MFD capacitor.

OVERALL VIDEO IF RESPONSE CHECK

Use only enough sweep generator output for useable pattern on scope. If sweep generator has no built in marker, couple marker generator loosely to sweep generator output.
Leave bias connected as under "Video IF Alignment".
Connect the synchronized sweep voltage from the sweep generator to the horizontal input of the oscilloscope for horizontal deflection.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
8.	Direct	High side to an ungrounded tube shield floating over converter tube (V4). Low side to chassis.	44MC (10MC Swp.)	41.25MC 42.25MC 42.8MC 44.75MC 45.75MC	Any	Vert. Amp. thru 47KΩ to point Ⓐ. Low side to chassis.		Check for response similar to Fig. 1. Response curve should be slightly tilted as shown, to compensate for the capacitor coupling of the sweep generator. If necessary retouch A1, A2, A3 for desired response. A1 affects the 45.75MC marker placement. A2 affects the slope between 41.25MC and 42.8MC and the placement of 42.25MC marker. A3 affects principally the tilt.

SOUND IF ALIGNMENT USING AM SIGNAL GENERATOR AND VTVM

Set contrast control to minimum.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	CHANNEL	CONNECT VTVM	ADJUST	REMARKS
9.	.005MFD	High side to point Ⓐ. Low side to chassis.	4.5MC (Unmod.)	Any	DC probe to point Ⓑ. Common to chassis.	A7, A8	Adjust for maximum deflection.
10.	"	"	"	"	DC probe to point Ⓒ. Common to chassis.	A9	Adjust for zero reading. A positive and negative reading will be obtained on either side of the correct setting.

SOUND IF ALIGNMENT USING FM SIGNAL GENERATOR AND OSCILLOSCOPE

Set contrast control to minimum.
Use frequency modulated signal with 80% modulation and 480KC sweep. Use 120% sawtooth voltage in scope for horizontal deflection.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
9.	.005MFD	High side to point Ⓐ. Low side to chassis.	4.5MC (450KC Swp.)	4.5MC	Any	Vert. Amp. to point Ⓑ. Low side to chassis.	A7, A8	Disconnect stabilizer capacitor C4. Adjust for curve of maximum amplitude and symmetry as in Fig. 8.
10.	"	"	"	"	"	Vert. Amp. to point Ⓒ. Low side to chassis.	A9	Reconnect C4. Adjust so that 4.5MC occurs at center of crossover lines as in Fig. 8. SLIGHTLY retouch A8 for maximum amplitude and straightness of crossover lines.

4.5MC TRAP ALIGNMENT

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	CHANNEL	CONNECT VTVM	ADJUST	REMARKS
11.	.005MFD	High side to point Ⓐ. Low side to chassis.	4.5MC (Unmod.)	Any	DC probe thru detector (Fig. 4) to pin 2 of picture tube. Common to chassis.	A10	Adjust for MINIMUM deflection.

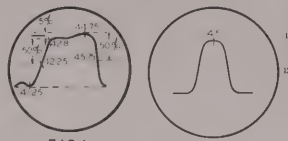


FIG. 1

FIG. 2

FIG. 3

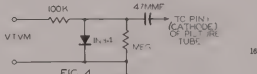


FIG. 4

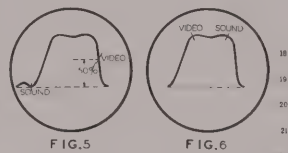


FIG. 5

FIG. 6

FIG. 7

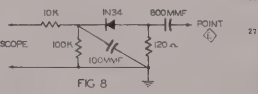


FIG. 8

VHF OSCILLATOR ALIGNMENT FOR TUNERS IC1717 AND IE1718

Remove the dummy converter tube and replace original 6J6 in its socket. Connect bias as under "Video IF Alignment".
The bottom tuner cover and tube shields should be in place.
Connect the synchronized sweep voltage from the sweep generator to the horizontal input of the oscilloscope for horizontal deflection.
The sweep generator output lead should be terminated with its characteristic impedance, usually 50Ω.
Set the fine tuning control to the mid-position of its range.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
12.	Two 120Ω Carbon Resistors	Across antenna terminals with 120Ω in each lead.	213MC (10MC Swp.)	211.25MC 215.75MC	13	Vert. Amp. to point Ⓐ. Low side to chassis.	A11	Adjust to place sound marker in notch as in Fig. 5. Video marker should be at 50% on response curve.
13.	"		207MC (10MC Swp)	205.25MC 209.75MC	12			Check high band channels for correct marker placement as in Fig. 5. If necessary make SLIGHT compromise adjustment of A11 for best marker placement on all channels.
			201MC (10MC Swp)	199.25MC 203.75MC	11			
			195MC (10MC Swp)	193.25MC 197.75MC	10			
			189MC (10MC Swp)	187.25MC 191.75MC	9			
			183MC (10MC Swp)	181.25MC 185.75MC	8			
			177MC (10MC Swp)	175.25MC 179.75MC	7			
14.	"		85MC (10MC Swp)	83.25MC 87.75MC	6		A12	Adjust to place sound marker in notch as in Fig. 5. Video marker should be at 50% on response curve.
15.	"		79MC (10MC Swp)	77.25MC 81.75MC	5			Check low band channels for correct marker placement as in Fig. 5. If necessary make SLIGHT compromise adjustment of A12 for best marker placement on all channels.
			69MC (10MC Swp)	67.25MC 71.75MC	4			
			63MC (10MC Swp)	61.25MC 65.75MC	3			
			57MC (10MC Swp)	55.25MC 59.75MC	2			

VHF RF AND MIXER ALIGNMENT FOR TUNERS IC1717 AND IE1718

Use only enough sweep generator output for useable indication on scope.
Connect the negative lead of a 1.5 volt battery to terminal #8 on back of tuner. Connect the positive lead to chassis. If sweep generator has no built-in marker, loosely couple marker generator to sweep generator output.
Connect the synchronized sweep voltage from the sweep generator to the horizontal input of the oscilloscope for horizontal deflection.
The sweep generator output lead should be terminated with its characteristic impedance, usually 50Ω.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
16.	Two 130Ω Carbon Resistors	Across VHF antenna terminals with 130Ω in each lead.	215MC (10MC Swp)	213.25MC 215.75MC	13	Vert. Amp. thru detector (Fig. 4) to point Ⓓ. Low side to chassis.	A13, A14, A15	Adjust A13, A14 and A15 for response curve similar to Fig. 6. If A15 has no adjustable core, adjust by compressing or expanding turns.
17.	"	"	207MC (10MC Swp)	205.25MC 209.75MC	12	"	A16, A17, A18	Check for response curve similar to Fig. 6. If necessary, adjust the coil loops. Pulling the half coil loops away from the switch wafer will decrease frequency. Pushing them in toward the center of the switch wafer will increase the frequency. Adjust for maximum gain with correct video and sound marker positions.
18.	"	"	201MC (10MC Swp)	199.25MC 203.75MC	11	"	A19, A20, A21	"
19.	"	"	195MC (10MC Swp)	193.25MC 197.75MC	10	"	A22, A23, A24	"
20.	"	"	189MC (10MC Swp)	187.25MC 191.75MC	9	"	A25, A26, A27	"
21.	"	"	183MC (10MC Swp)	181.25MC 185.75MC	8	"	A28, A29, A30	"
22.	"	"	177MC (10MC Swp)	175.25MC 179.75MC	7	"	A31, A32, A33	"
23.	"	"	85MC (10MC Swp)	83.25MC 87.75MC	6	"	A34, A35, A36	Check for response curve similar to Fig. 6. If necessary, adjust the coil turns to obtain desired response. Adjust for maximum gain with correct video and sound marker positions. Compressing coil turns together will decrease the frequency. Expanding coil turns increases the frequency.
24.	"	"	79MC (10MC Swp)	77.25MC 81.75MC	5	"	A37, A38, A39	"
25.	"	"	69MC (10MC Swp)	67.25MC 71.75MC	4	"	A40, A41, A42	"
26.	"	"	63MC (10MC Swp)	61.25MC 65.75MC	3	"	A43, A44, A45	"
27.	"	"	57MC (10MC Swp)	55.25MC 59.75MC	2	"	A46, A47, A48	"

UHF IF STAGE ALIGNMENT FOR IE1680 AND IE1855 UHF TUNERS

Switch channel selector to UHF position.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
28.	Direct	High side to pin 7 (grid) of UHF IF amplifier tube (6BZ7). Low side to chassis. (Remove the side shield on tuner to connect sweep generator)	44MC (10MC Swp)	42.25MC 45.75MC	Any unused channel between 35 and 45	Vert. Amp. thru detector (Fig. 4) to pin 5 (plate) of 5C D6 (V5). Low side to chassis.	A48, A50	Loosely couple marker generator to sweep generator output. Adjust A49 for response curve similar to Fig. 7. Check position of 42.25MC and 45.75MC markers. If markers do not fall on peaks of curve adjust A50 (compress or expand coil turns). Recheck adjustment A49 if A50 requires adjusting.

HALLICRAFTERS MODELS 17K1108, M; 17K1118, M; 17T1008, M; 17T1018, M; 17T1708, M; 17T1718, M; 21K1408, M; 21K1418, M; 21K1508, M; 21K1518, M; 21T1208, M; 21T1218, M; 21T1608, M; 21T1618, M (CH. A1K3008, B13008, C13008, D13008, E13008, F13008, H13008, J13008).

ALIGNMENT INSTRUCTIONS (cont)

UHF OSCILLATOR ALIGNMENT FOR TUNERS IE1660 AND IE1855

When replacing the UHF oscillator tube it may be possible to try several tubes for one which gives the best performance. This portion of the receiver has been aligned at the factory and is very stable. If it becomes necessary, proceed as follows:
Switch channel selector to UHF position.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
29.	100 to 800MMF Capacitor	High side of UHF signal generator to diode crystal clip osc. section in the UHF tuner. Low side to chassis.	Not used	945MC (400∿ Mod.)	High freq. end. (Tuning gang fully clockwise)	Vert. Amp. thru detector (Fig. 8) to point (E). Low side to chassis.	A51	Use low generator output. Adjust A51 for MINIMUM 400∿ indication on scope.
30.	"	"	"	504MC (400∿ Mod.)	Low freq. end. (Tuning gang fully counter clockwise)	"	A52	In tuner IE1855 adjust A52 for MINIMUM 400∿ indication on scope. If necessary replace oscillator tube (6T4) and repeat steps 29 and 30. A52 adjustment not in tuner IE1660. If adjustment A51 will not adjust properly, replace UHF oscillator tube (6J6) and repeat step 29.

UHF RF AND MIXER ALIGNMENT FOR TUNERS IE1660 AND IE1855

This portion of the receiver has been properly aligned at the factory and is very stable. Alignment of this portion is not recommended in the field.

VHF OSCILLATOR ALIGNMENT FOR TUNERS IE1846 AND IE1852

In tuner IE1846, complete oscillator alignment may not be necessary. If the oscillator seems to be off frequency approximately the same amount for a majority of the channels it may be possible to correct them in one step using adjustment A53. It should be noted that this is an all channel oscillator adjustment and should not be used to correct any individual channel. If adjustment A53 will not bring all channels well within range of the fine tuning control it will be necessary to adjust the channel strip adjustment screw for each channel that is off frequency.
Note: All channel adjustment A53 is not in VHF tuner IE1852. The channel oscillator adjustment screws are reached through a hole to the right of the fine tuning shaft. The correct adjustment screw is accessible through this hole as the channel switch is turned to each channel.
Connect the synchronized sweep voltage from the sweep generator to the horizontal input of the oscilloscope for horizontal deflection.
The sweep generator output lead should be terminated with its characteristic impedance, usually 50Ω.
Set the fine tuningcontrol to the mid-position of its range.

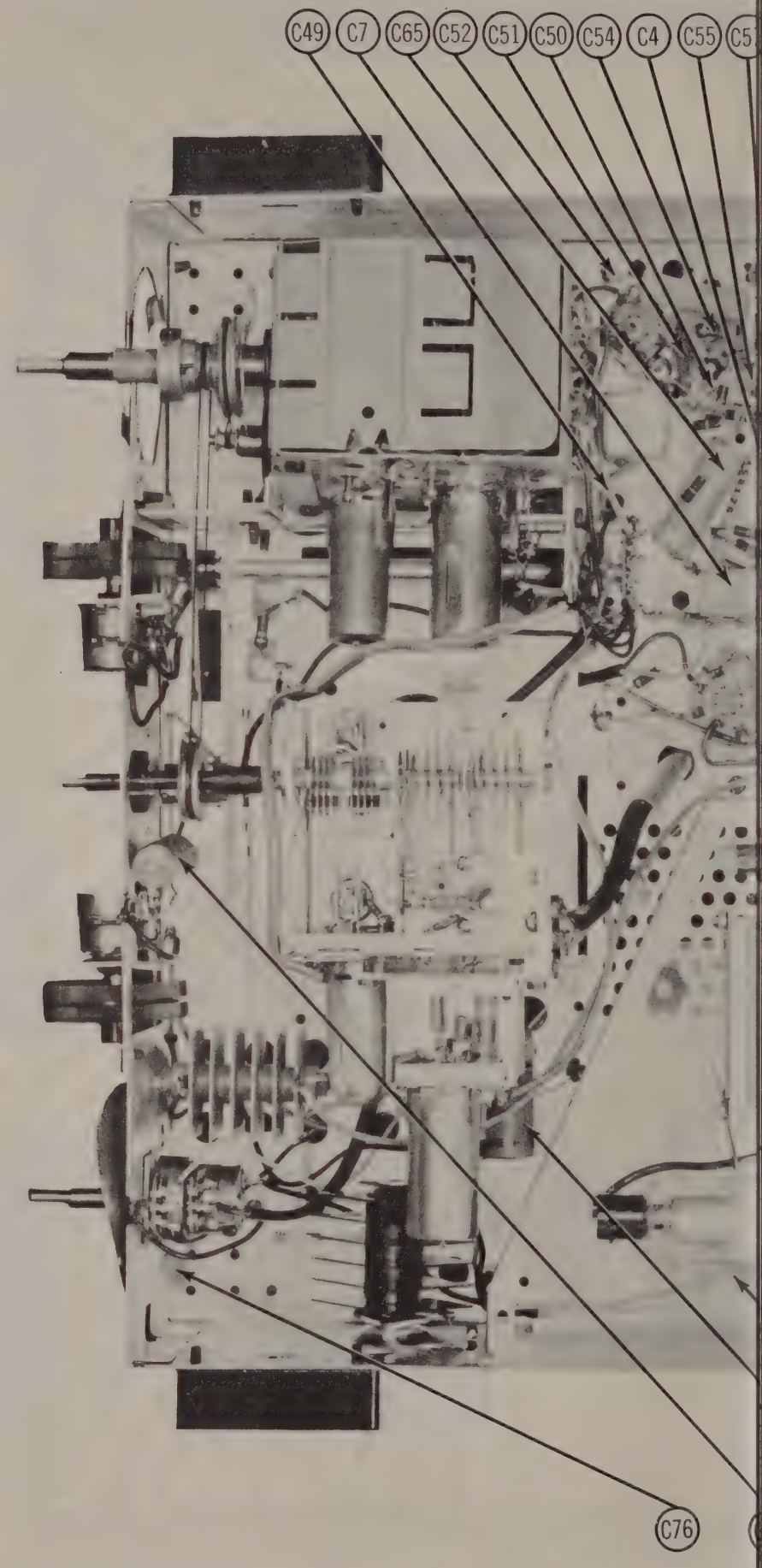
	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
31.	Two 120Ω Carbon Resistors	Across VHF antenna terminals with 120Ω in each lead.	213MC (10MC Swp.)	211. 25MC 215. 75MC	13	Vert. Amp. thru 10KΩ to point (A). Low side to chassis.	A54	Adjust to place sound marker in trap notch as in Fig. 5. Video marker should beat 50%.
			207MC (10MC Swp.)	205. 25MC 209. 75MC	12		A55	
			201MC (10MC Swp.)	199. 25MC 203. 75MC	11		A56	
			195MC (10MC Swp.)	193. 25MC 197. 75MC	10		A57	
			189MC (10MC Swp)	187. 25MC 191. 75MC	9		A58	
			183MC (10MC Swp.)	181. 25MC 185. 75MC	8		A59	
			177MC (10MC Swp.)	175. 25MC 179. 75MC	7		A60	
			85MC (10MC Swp.)	83. 25MC 87. 75MC	6		A61	
			79MC (10MC Swp.)	77. 25MC 81. 75MC	5		A62	
			69MC (10MC Swp.)	67. 25MC 71. 75MC	4		A63	
			63MC (10MC Swp.)	61. 25MC 65. 75MC	3		A64	
			57MC (10MC Swp.)	55. 25MC 59. 75MC	2		A65	

VHF RF AND MIXER ALIGNMENT OF TUNERS IE1846 AND IE1852

Connect the negative lead of a 3 volt bias supply to the VHF tuner AGC line. Connect the positive lead to chassis.
Connect the synchronized sweep voltage from the sweep generator to the horizontal input of the oscilloscope for horizontal deflection.
The sweep generator output lead should be terminated with its characteristic impedance, usually 50Ω.

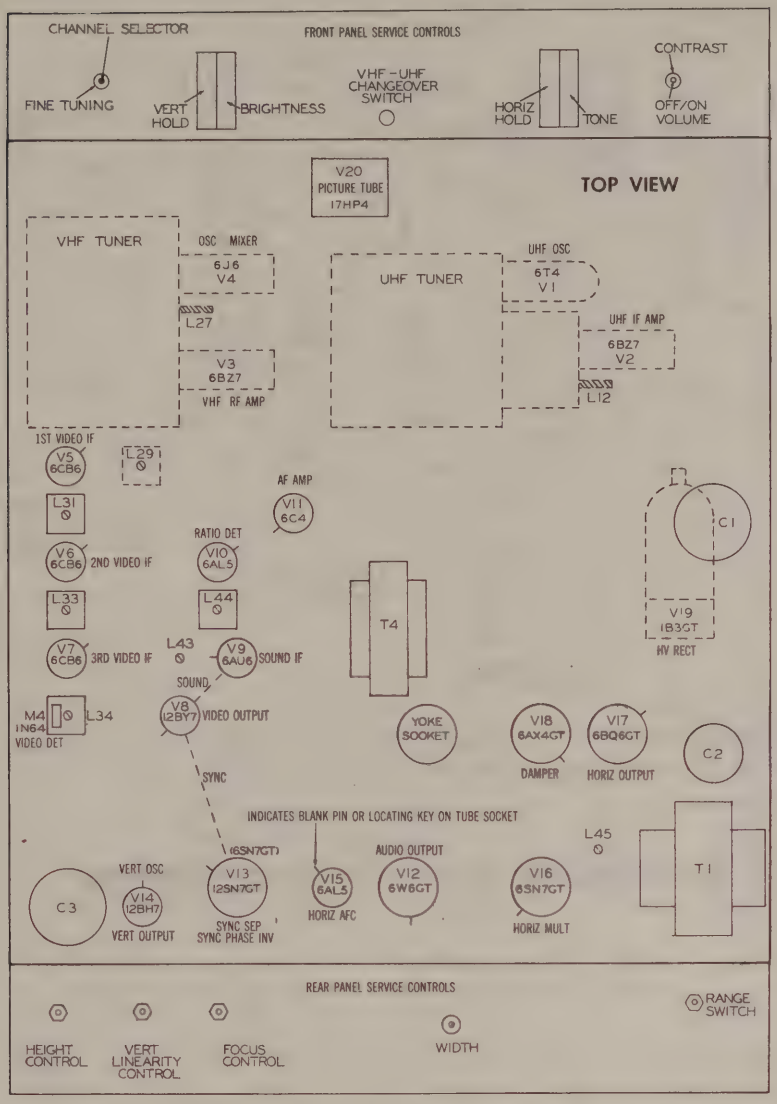
	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
32.	Two 120Ω Carbon Resistors	Across VHF antenna terminals with 120Ω in each lead.	195MC (10MC Swp.)	193. 25MC 197. 75MC	10	Vert. amp. thru 10KΩ to point (F). Low side to chassis.	A66, A67, A68, A69	Adjust for response curve similar to Fig. 6. If unable to obtain the correct band width by adjusting A66, A67 and A68, slightly adjust A69 (wire gimmick). To increase band width, adjust A69 away from contacts. To decrease band width adjust A69 closer to contacts.
33.	"	"	213MC (10MC Swp.)	211. 25MC 215. 75MC	13	"		Check for response similar to Fig. 6. If markers fall below 70% on any channel, make compromise adjustments of A66, A67 and A68 with channel switch set to that channel. Then recheck all other channels to see that they have not been seriously affected. Do not readjust A69 on any channel except channel 10.
			207MC (10MC Swp.)	205. 25MC 209. 75MC	12			
			201MC (10MC Swp.)	199. 25MC 203. 75MC	11			
			189MC (10MC Swp.)	187. 25MC 191. 75MC	9			
			183MC (10MC Swp.)	181. 25MC 185. 75MC	8			
			177MC (10MC Swp.)	175. 25MC 179. 75MC	7			
			85MC (10MC Swp.)	83. 25MC 87. 75MC	6			
			79MC (10MC Swp.)	77. 25MC 81. 75MC	5			
			69MC (10MC Swp.)	67. 25MC 71. 75MC	4			
			63MC (10MC Swp.)	61. 25MC 65. 75MC	3			
			57MC (10MC Swp.)	55. 25MC 59. 75MC	2			

RESISTOR IDENTIFICATION



CHASSIS BOTTOM VIE

TUBE PLACEMENT CHART



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TUBE FAILURE CHECK CHART

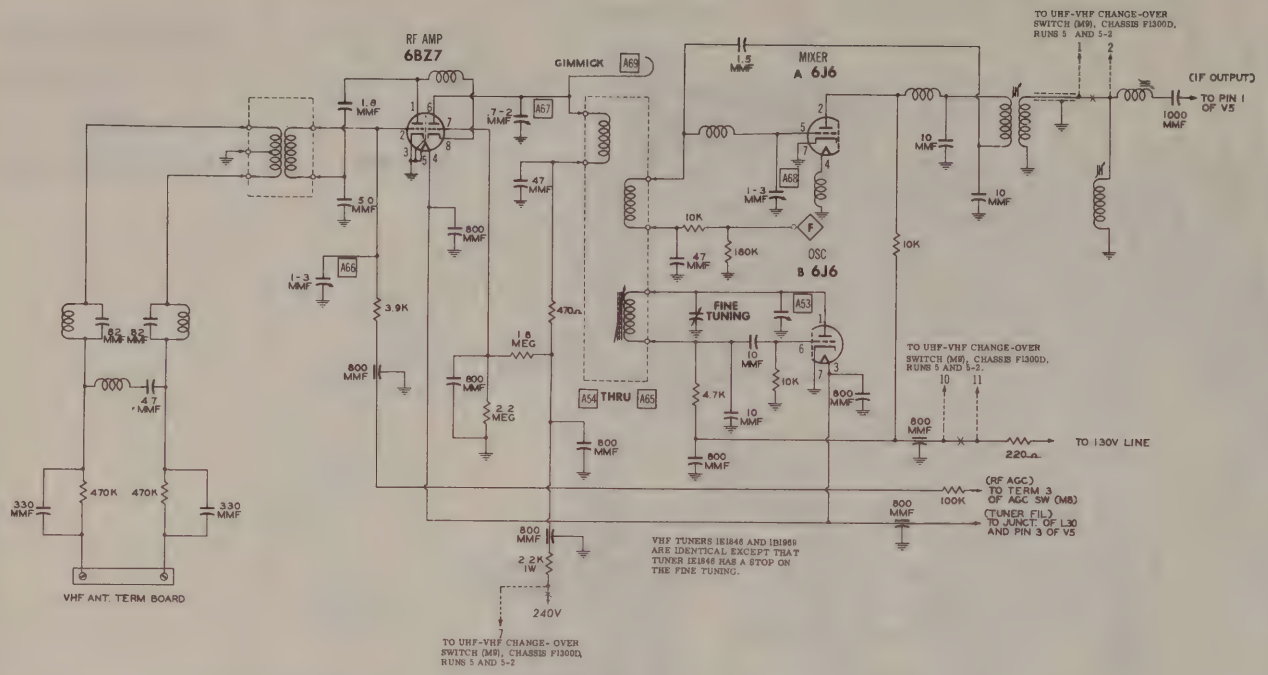
The following chart lists tubes whose failures are most likely to produce the indicated symptoms. Refer to tube placement chart for location and type of tube.

POWER SUPPLY FAILURE
No raster, no sound - **Selenium Rectifiers (M1 & M2)**

LOSS OF PICTURE OR SOUND
No pic, no sound, has raster - **V4, V5, V6, V7, V8, V12 (V1, V2 UHF only)**
No pic, no sound, has snow - **V3, V4, V5**
No pic, has sound, has raster -**V8, V20**
Has pic, no sound - **V9, V10, V11, V12**

SYNC FAILURE
No vert. sync - **V13, V14**
No horiz. sync - **V13, V15, V16**
No vert. or horiz. sync - **V13**

SWEEP FAILURE
No raster, has sound - **V16, V17, V18, V19, V20**
No vertical deflection - **V14**
Poor vert. linearity or foldover - **V14**
Poor horiz. linearity or foldover - **V16, V17, V18**
Narrow picture - **V16, V17, V18, V19, M1, M2**
Vert. off freq. - **V13, V14**
Horiz. off freq. - **V13, V15, V16**



VHF TUNER PART NO. 1E1846 USED WITH CHASSIS A1300D RUNS 2, AND 2-2; C1300D RUN 3; E1300D RUNS 2, 2-2, AND 2B-2; J1300D RUNS 1A, 1A-2, 1AB, AND 1AB2.

VHF TUNER PART NO 1E1969 USED WITH CHASSIS F1300D RUNS 5, AND 5-2.

A PHOTOFACT STANDARD NOTATION SCHEMATIC
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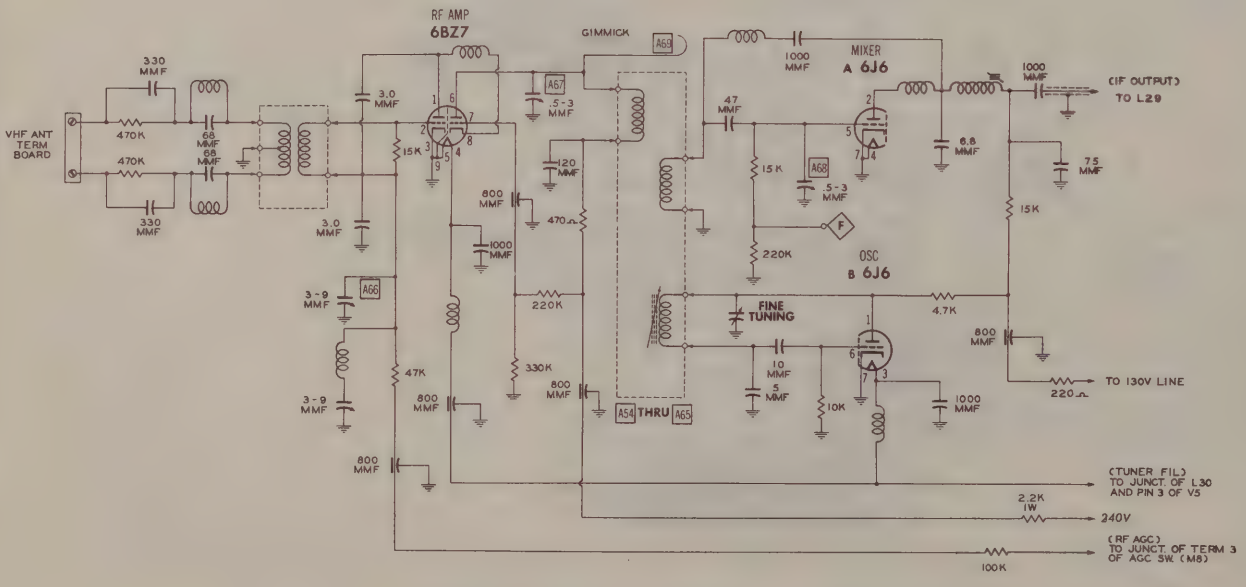
ALTERNATE VHF TUNER SCHEMATIC



VHF TUNER PART NO. 1E1852 USED WITH CHASSIS A1300D RUNS 1, AND 1-2; C1300D RUN 2; E1300D RUNS 1, AND 1-2; J1300D RUNS 1, 1-2, 1B, AND 1B-2

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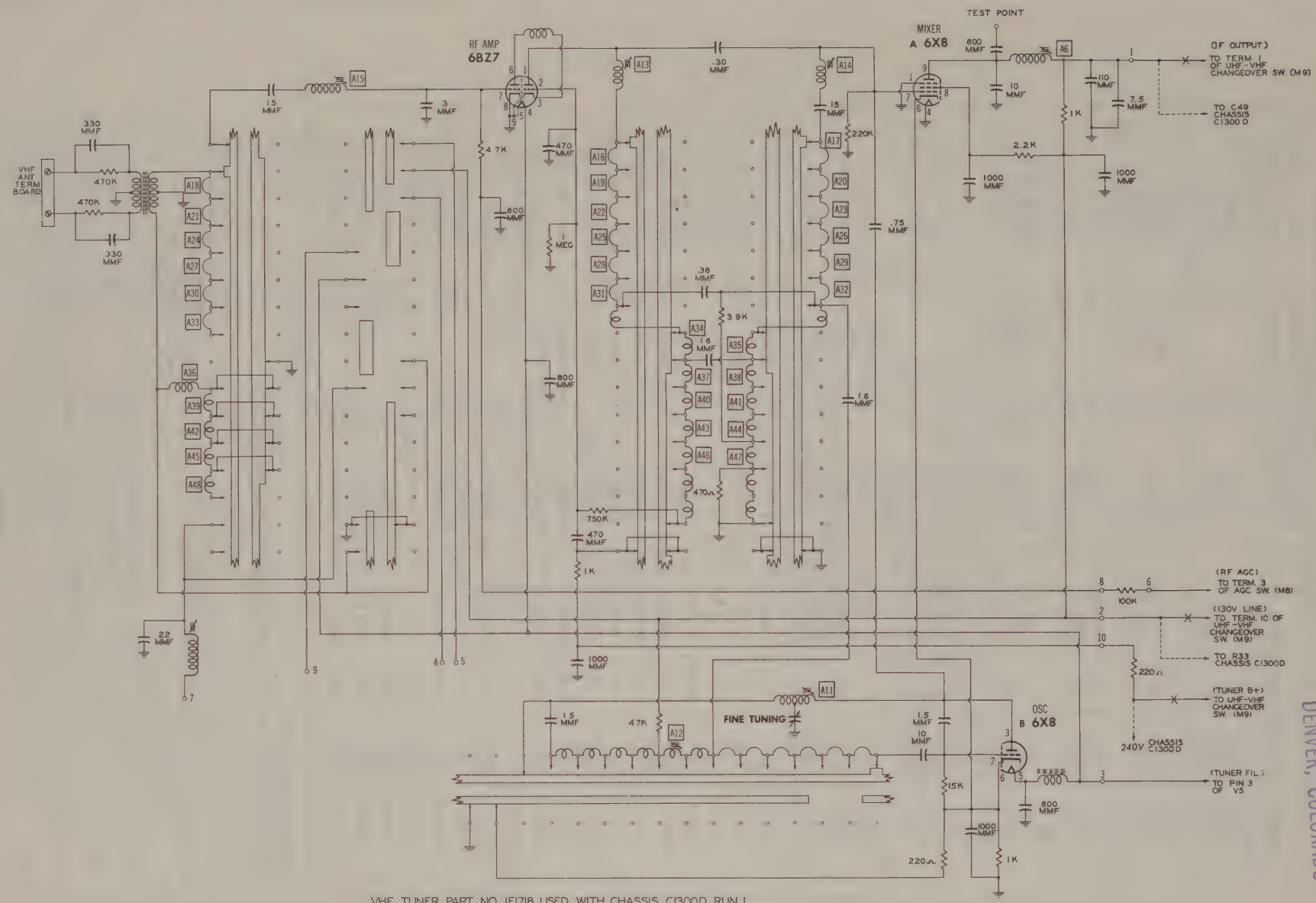
ALTERNATE VHF TUNER SCHEMATIC



VHF TUNER PART NO. 1E1718 USED WITH CHASSIS C1300D RUN 1
VHF TUNER PART NO. 1E1670 USED WITH CHASSIS B1300D RUN 3; D1300D RUN 1; F1300D RUN 3
H1300D RUNS 1, 1-2, 1A, 1A-2, 1AB, 1AB-2, AND 1B-2

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ALTERNATE VHF TUNER SCHEMATIC

HALLICRAFTERS MODELS 17K1110B, M, 17K111B, M, 17T100B, M, 17T101B, M, 17T170B, M, 17T172B, M, 21K140B, M, 21K141B, M, 21K150M, 21K151M, 21T120B, M, 21T121B, M, 21T160B, M, 21T161B, M (Ch. A1300D, B1300D, C1300D, D1300D, E1300D, F1300D, H1300D, J1300D)

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COMPARISON OF 1300D SERIES CHASSIS

The A1300D, Run 1 may be considered the basic chassis in this series. All other chassis listed are based on the A1300D chassis with one or more modifications used in any particular chassis.

CHASSIS	PIX TUBE	SIZE	TYPE FOCUS	VHF CASCODE TUNER	UHF TUNER	MODIFICATIONS
A1300D						
Run 1	17HP4	17"	Glass E.S.	1E1852		Basic Chassis
Run 1-2	17HP4	17"	Glass E.S.	1E1852		XI
Run 2	17HP4	17"	Glass E.S.	1E1846		I
Run 2-2	17HP4	17"	Glass E.S.	1E1846		I, XI
B1300D *						
Run 1	17HP4	17"	Glass E.S.	1C1717	1E1660	II, III, IV
Run 2	17HP4	17"	Glass E.S.	1C1717	1E1855	II, III, V
Run 3	17HP4	17"	Glass E.S.	1E1670	1E1660	II, IV, VIII
C1300D						
Run 1	17HP4	17"	Glass E.S.	1E1718		VI, VII
Run 2	17HP4	17"	Glass E.S.	1E1852		VII
Run 3	17HP4	17"	Glass E.S.	1E1846		I, VII
D1300D						
Run 1	17HP4	17"	Glass E.S.	1E1670	1E1660	III,IV, VII, VIII
Run 2	17HP4	17"	Glass E.S.	1C1717	1E1660	II, III, IV, VII
Run 3	17HP4	17"	Glass E.S.	1C1717	1E1855	II, III, V, VII
Run 3-1	21AP4	21"	Metal P.M.	1C1717	1E1855	II, III, V, VII, IX
E1300D						
Run 1	21AP4	21"	Metal P.M.	1E1852		IX
Run 1-2	21AP4	21"	Metal P.M.	1E1852		IX, XI
Run 2	21AP4	21"	Metal P.M.	1E1846		I, IX
Run 2-2	21AP4	21"	Metal P.M.	1E1846		I, IX, XI
Run 2B-2	21AP4	21"	Metal P.M.	1E1846		I, IX, XI, XIII
F1300D						
Run 1	21AP4	21"	Metal P.M.	1C1717	1E1660	II, III, IV, IX
Run 2	21AP4	21"	Metal P.M.	1C1717	1E1855	II, III, V, IX
Run 2-2	21AP4	21"	Metal P.M.	1C1717	1E1855	II, III, V, IX, XI
Run 3	21AP4	21"	Metal P.M.	1E1670	1E1660	III, IV, VIII, IX
Run 5	21AP4	21"	Metal P.M.	1B1969	1E1855	III, V, IX, X
Run 5-2	21AP4	21"	Metal P.M.	1B1969	1E1855	III, V, IX, X, XI
H1300D						
Run 1	17HP4/ 21YP4	17-21"	Glass E.S.	#1E1670	1E1660	III, IV, VIII, *XII, XIV
Run 1A	17HP4/ 21YP4	17-21"	Glass E.S.	#1E1670	1E1855	III, V, VIII, *XII, XIV
Run 1AB	17HP4/ 21YP4	17-21"	Glass E.S.	#1E1670	1E1855	III, V, VIII, *XII, XIII, XIV
Run 1-2	17HP4/ 21YP4	17-21"	Glass E.S.	#1E1670	1E1660	III, IV, VIII, XI, *XII, XIV
Run 1A-2	17HP4/ 21YP4	17-21"	Glass E.S.	#1E1670	1E1855	III, V, VIII, XI, *XII, XIV
Run 1AB-2	17HP4/ 21YP4	17-21"	Glass E.S.	#1E1670	1E1855	III, V, VIII, XI, *XII, XIII, XIV
Run 1B-2	17HP4/ 21YP4	17-21"	Glass E.S.	#1E1670	1E1660	III,IV , V, VIII, XI, *XII, XIII, XIV
Run 2	17HP4/ 21YP4	17-21"	Glass E.S.	1C1717	1E1855	II, III, V, *XII, XIV
Run 2-2	17HP4/ 21YP4	17-21"	Glass E.S.	1C1717	1E1855	II, III, V, XI, *XII, XIV
Run 2B-2	17HP4/ 21YP4	17-21"	Glass E.S.	1C1717	1E1855	II, III, V, XI, *XII, XIII, XIV
J1300D						
Run 1	17HP4/ 21YP4	17-21"	Glass E.S.	1E1852		*XII, XIV
Run 1B	17HP4/ 21YP4	17-21"	Glass E.S.	1E1852		*XII, XIII, XIV
Run 1AB	17HP4/ 21YP4	17-21"	Glass E.S.	1E1846		I, *XII, XIII, XIV
Run 1-2	17HP4/ 21YP4	17-21"	Glass E.S.	1E1852		XI, *XII, XIV
Run 1A-2	17HP4/ 21YP4	17-21"	Glass E.S.	1E1846		I, XI, *XII, XIV
Run 1AB-2	17HP4/ 21YP4	17-21"	Glass E.S.	1E1846		I, XI, *XII, XIII, XIV
Run 1B-2	17HP4/ 21YP4	17-21"	Glass E.S.	1E1852		XI, *XII, XIII, XIV

* Used only with 21" Models.
# Or 1E1483 VHF Tuner.
Tuners 1E1846 and 1B1969 are identical except that 1E1846 has fine tuning stop.

MODIFICATION I

LOCATION OF CHANGE	CHANGE MADE
A. Tuner B. 1st. Video IF Coil C. Grid of 1st. IF (pin 1 of V5).	A. Tuner changed to part #1E1846. B. L29 changed to part #51B1841. C. C49 added from L29 to pin 1 of V5.

MODIFICATION II

LOCATION OF CHANGE	CHANGE MADE
A. Tuner B. 1st. Video IF Coupling.	A. Tuner changed to part #1C1717. B. C49 added from 29 to terminal #1 of tuner.

MODIFICATION III

LOCATION OF CHANGE	CHANGE MADE
A. Tuner	A. On UHF models V2 is added.

PARTS LIST AND DESCRIPTIONS

TUBES (SYLVANIA, GENERAL ELECTRIC, WESTINGHOUSE)

ITEM No.	USE	REPLACEMENT DATA: Hallicrafters PART No.	REPLACEMENT DATA: STANDARD REPLACEMENT	RETMA BASE TYPE	NOTES
V1	UHF Osc.	6T4	6T4	7DK	
V2	UHF IF Amplifier	6BZ7	6BZ7	9AJ	
V3	RF Amplifier	6BZ7	6BZ7	9AJ	
V4	Mixer-Osc.	6J6	6J6	7BF	
V5	1st. Video IF Amp.	6CB6	6CB6	7CM	
V6	2nd. Video IF Amp.	6CB6	6CB6	7CM	
V7	3rd. Video IF Amp.	6CB6	6CB6	7CM	
V8	Video Output	12BY7	12BY7	9BF	
V9	Sound IF Amp.	6AU6	6AU6	7BK	
V10	Ratio Detector	6AL5	6AL5	6BT	
V11	AF Amplifier	6C4	6C4	6BG	
V12	Audio Output	6W6GT	6W6GT	7AC	
V13	Sync Separator-Sync Phase Inv.	12SN7GT	12SN7GT	8BD	6SN7GT used on some runs
V14	Vert. Osc.-Vert. Output	12BH7	12BH7	9A	
V15	Horiz. AFC	6AL5	6AL5	6BT	
V16	Horiz. Mult.	6SN7GT	6SN7GT	8BD	
V17	Horiz. Output	6BQ6GT	6BQ6GT	6AM	
V18	Damper	6AX4GT	6AX4GT	4CG	
V19	HV Rectifier	1B3GT	1B3GT	3C	

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CATHODE-RAY TUBE

ITEM No.	REPLACEMENT DATA: Hallicrafters PART No.	CBS PART No.	GENERAL ELECTRIC PART No.	SYLVANIA PART No.	WESTINGHOUSE PART No.	RETMA BASE TYPE	NOTES
V20	17HP4	17HP4/17RP4	17RP4/17HP4	17HP4/17RP4	17HP4/17RP4	12L	① Aluminized ② Silver screen
		17HP4B ①		17HP4B ②		12L	
	21AP4	21AP4	21AP4			12D	
	21YP4	21YP4	21YP4	21YP4	21YP4	12L	
		21YP4A ①	21YP4A ①	21YP4A ②	21YP4A ①	12L	

ELECTROLYTIC CAPACITORS

ITEM No.	RATING: CAP.	RATING: VOLT.	REPLACEMENT DATA: Hallicrafters PART No.	MALLORY PART No.	PYRAMID PART No.	SANGAMO PART No.	NOTES
C1	200	150	45B217	FP118	TM-200-150	S-110	
C2A	▲100	300	45C209	FP419.4	TM-4007	Q-163	
B	■10	300					
C	▲200	150					
D	30	150					
C3A	▲200	150	45C210	FP216.1	TM-2029	D-088	
B	▲5	150					
C4	5	50	45B175	TC30	TD-5-50	MMT-0505	
C5	1	50	45A163	TC31	TD-1-50	MMT-0505	
C6	100	10	45B170	TC2501	TD-100-15	MTH-1210	
C7	10	150	45A097	TC42	TD-10-150	FM-1512	
C8	20	450	45B208	TC75	TD-20-450	FM-4520	

FIXED CAPACITORS

Capacity values given in the rating column are in mfd. for Paper Capacitors, and in mmfd. Mica and Ceramic Capacitors.

ITEM No.	RATING: CAP.	RATING: VOLT.	REPLACEMENT DATA: Hallicrafters PART No.	CENTRALAB PART No.	ERIE PART No.	MALLORY PART No.	NOTES
C9	330	1500	47A447	DD30-331	1R5KV-331	DC30333	
C10	330	1500	47A447	DD30-331	1R5KV-331	DC30333	
C11	1-4		121A296	829-4	3115-01-10	CT551	
C12	.7						
C13	1000		121A298	MFT-1000			
C14	1000		121A298	MFT-1000			
C15	33		121A297	TCN-33	N750K-330		
C16	470		47C20A471N	D6-471	GP2K-471	UC-5347	
C17	470		47C20A471N	D6-471	GP2K-471	UC-5347	
C18	470		47C20A471N	D6-471	GP2K-471	UC-5347	
C19	470		47C20A471N	D6-471	GP2K-471	UC-5347	
C20	1000		47B402	MFT-1000			
C21	470		47C20A471N	D6-471	GP2K-471	UC-5347	
C22	4.7		47X20UK047K/D	TCZ-4R7	NP0A-4R7	ZT-5547	
C23	82		47C20A820J				
C24	1000		47B402	MFT-1000			
C25	330	1500	47A447	DD30-331	1R5KV-331	DC30333	
C26	330	1500	47A447	DD30-331	1R5KV-331	DC30333	
C27	4		121A114				
C28	1.6		121A071				
C29	7.5		45A362				
C30	800		47A355	DD-801	831-801	DC-521	
C31	800		47A355	DD-801	831-801	DC-521	
C32	.33		121A122				
C33	.56		121A073				
C34	1.2		121A121				
C35	100		121A115	D6-101	GP1K-101	UC-531	
C36	470		47A357	MFT-500			
C37	800		47A355	DD-801	831-801	DC-521	
C38	470		121A826	MFT-500			
C39	.39		121A124				
C40	10		121A118	TCN-10	N750K-100	NT-541	
C41	1.5		121A123		N330A-1R5		
C42	800		47A355	DD-801	831-801	DC-521	
C43	62		121A126				
C44	15		121A119	TCZ-15	NP0K-150		
C45	140		121A125				
C46	5000		47A168	DD-502	811-005	DC-525	
C47	800		47A355	DD-801	831-801	DC-521	
C48	5000		47A168	DD-502	811-005	DC-525	Note 1
C49	1000		47B230	DD-102	801-001	DC-521	
C50	1000		47B230	DD-102	801-001	DC-521	
C51	820		47B320				Note 3
C52	1000		47A230	DD-102	801-001	DC-521	

HALLICRAFTERS MODELS 17K110B, M, 17K111B, M, 17T100B, M, 17T101B, M, 17T170B, M, 17T171B, M, 21K140B, M, 21K141B, M, 21K150M, 21K151M, 21T120B, M, 21T121B, M, 21T160B, M, 21T161B, M (Ch. A1300D, B1300D, C1300D, D1300D, E1300D, F1300D, H1300D, J1300D)

CAPACITORS (cont)

ITEM No.	RATING CAP.	RATING VOLT.	REPLACEMENT DATA Hallicrafters PART No.	CENTRALAB PART No.	ERIE PART No.	MALLORY PART No.	NOTES
C53	5000		47A168	DD-502	811-005	DC-525	
C54	24		47CA20A240J				
C55	1000		47B230	DD-102	801-001	DC-521	
C56	820		47B320				
C57	1000		47A230	DD-102	801-001	DC-521	
C58	24		47CA20A240J				
C59	680		47A319				Note 3
C60	1000		47B230	DD-102	801-001	DC-521	
C61	1000		47A230	DD-102	801-001	DC-521	
C62	1000		47B230	DD-102	801-001	DC-521	
C63	10		47CA20100F	D6-100	GP1K-100	UC-541	
C64	4.7		47A160-6	TCZ-4R7	NP0A-4R7	ZT-5547	
C65	.5	25	46A177				
C66	.05	200	46AU503J	DF-503		PT415	
C67	.1	400	46AV104J	DF-104		PT401	
C68	30		47X25PG300K				
C69	.1	400	46AV104J	DF-104		PT401	
C70	2.2		47A160-4				Note 3
C71	68		47X30TH680K				
C72A	4000		47A218	D6-402	822-004	DCD-524	
B	4000			D6-402			
C73	330		47C20331M	D6-331	GP2K-331	UC-5333	
C74	1000		47A230	DD-102	801-001	DC-521	
C75	5000		47A168	DD-502	811-005	DC-525	
C76	5000		47A168	DD-502	811-005	DC-525	
C77	10000		47A224	DD-103	811-01	DC-511	
C78	.05	600	46AY503J	DF-503		PT615	
C79	.02	600	46AY203J	DF-203	817-02	PT612	
C80	1000		47A230	DD-102	801-001	DC-521	
C81	220		47CA20221K	D6-221	GP2K-331	UC-5322	
C82	.005	600	46AY502J	D6-502	GP2-333-502	PT625	
C83	22		47CA20220M	D6-220	GP1K-220	UC-5422	
C84	.05	600	46AW503J	DF-503		PT615	
C85	.0047	400	46BS472L4	D6-472	GP2-333-472	PT6247	
C86	.0047	400	46BS472L4	D6-472	GP2-333-472	PT6247	
C87	.01	400	46BS103L4	D6-103	GP2-333-103	PT411	
C88	470	500	47X20B471K	D6-471	811-471	MCB245	
C89	.047	400	46BS473L4	DF-503		PT4147	
C90	.047	400	46BS473L4	DF-503		PT4147	
C91	5000		47A168	DD-502	811-005	DC-525	
C92	5000		47A168	DD-502	811-005	DC-525	
C93	1000		47CA20A102M	D6-102	GP2L-102	UC-521	
C94	1000		47CA20A102M	D6-102	GP2L-102	UC-521	
C95	.1	400	46AU104J	DF-104		PT401	
C96	.003	600	46AW302J				Note 3
C97	.01	400	46AW103J	D6-103	GP2-333-103	PT411	
C98	.01	400	46AW103J	D6-103	GP2-333-103	PT411	Note 2
C99	3900	500				MCB463	
C100	390	500	47X20D391K	D6-391	811-391	MCB243	
C101	390	500	47X20D391K	D6-391	811-391	MCB243	
C102	5000		47A168	DD-502	811-005	DC-525	
C103	.1	600	46S104L6	DF-104		PT601	
C104	1000		47A230	DD-102	801-001	DC-521	
C105	.1	600	46BS104L6	DF-104		PT601	
C106	47	2000		DD30-470	3KV-470	DC30447	
C107	500	20000	47A308	TV3-502	413	HV20035A	Note 4

Note 1. Not used in some versions.
Note 2. When C97 is .02MFD (part #46AW203J), C98 is not used.
Note 3. Mfgr. recommends exact replacement.
Note 4. Used only with metal picture tube, or when a glass picture tube doesn't have an outer coating.

CONTROLS

ITEM No.	RATING RESISTANCE	RATING WATTS	REPLACEMENT DATA Hallicrafters PART No.	CENTRALAB PART No.	CLAROSTAT PART No.	IRC PART No.	MALLORY PART No.	INSTALLATION NOTES
R1A	1000Ω		25B1056	F1-5	RTV-531	QJ-610♦♦	UF13R †	Contrast (Panel)
B	1Meg			R2-52			UR16A †	Volume (Rear) Attach to R1A.
C	Switch			KB-1			US-26 †	Attach to R1B.
R2A	120KΩ		25B1046	F1-30♦		QJ-612††	UF753L♠	Horizontal Hold (Stop at 70KΩ) (Panel)
B	10KΩ			R2-23			UR14L ♠	Tone (Rear) Attach to R2A.
R2A	120KΩ		25B1090			QJ-812**		Horizontal Hold (See Note 1) (Panel)
B	10KΩ							Tone (Rear)
R3A	50KΩ		25B1047	F1-29		QJ-611*	UE957	Brightness (Panel)
B	1.1Meg			R2-51				Vertical Hold (Rear) Stop at 750KΩ
R4A	5Meg		25B998	AB-86▲	A47-4Meg-SA▲	Q11-141▲	U-65▲	Height (Stop at 4Meg)
B	Shaft		Not Req.	AK-4	KSS-3	Not Req.	Not Req.	Attach to R4A.
R5A	750Ω		25B999	AB-5	A47-750-S	Q11-105	U-4	Vertical Linearity
B	Shaft		Not Req.	AK-1	KSS-3	Not Req.	Not Req.	Attach to R5A.
R6A	1.5Meg		25B1003	AB-742	A47-1.5Meg-S	Q11-138	U-155	Focus (See Note 2)
B	Shaft		Not Req.	AK-4	KSS-3	Not Req.	Not Req.	Attach to R6A.
R7	5Ω							Hum Balance - Note 3
R8	50Ω							Horizontal Centering - Note 4

Note 1. Used in chassis H1300D, (all runs) and J1300D, (all runs) only.
Note 2. Not used in chassis D1300D, run 3-1, E1300D (all runs) and F1300D (all runs).
Note 3. Not used in some versions (control part of speaker).
Note 4. Not used in chassis C1300D (all runs) and D1300D (all runs) only.
▲ Connect a 1Meg resistor in series with the right hand terminal of the control and the lead connecting to the same terminal of the original control (control viewed from shaft end, terminals down.)
♦ Connect a 50KΩ resistor in series with the right hand terminal of the control and the lead connecting to the same terminal of the original control (control viewed from shaft end, terminals down.)
† Universal Replacement (Mallory Exact Duplicate Part No. UE53S)
♠ Universal Replacement (Mallory Exact Duplicate Part No. UE1127)
*CONCENTRIKIT EQUIVALENT, K-5 KIT, BASE ELEMENTS AND SHAFTS, B11-123, P1-017 (Panel) B11-136, R2-103 (Rear)
**CONCENTRIKIT EQUIVALENT, K-5 KIT, BASE ELEMENTS AND SHAFTS, B11-228, P1-017 B11-116, R2-103
††CONCENTRIKIT EQUIVALENT, K-5 KIT, BASE ELEMENTS AND SHAFTS, B11-125, P1-017 (Panel) B11-116, R2-103 (Rear)
♦♦CONCENTRIKIT EQUIVALENT, K-2 KIT, BASE ELEMENTS AND SHAFTS, B17-108 P1-106 (Panel) B13-137, R2-124 (Rear) 76-1 (Switch)

PARTS LIST AND DES

RESIST

ITEM No.	RATING OHMS	RATING WATT	REPLACEMENT DATA Hallicrafters PART No.	IRC PART No.	NOTES
R9	470KΩ	½	23X20X474K	BTS-470K	
R10	470KΩ	½	23X20X474K	BTS-470K	
R11	8200Ω	½	23X20X822K		
R12	6800Ω	1	23X30X682K		
R13	10KΩ	½	23X20X103K		
R14	120Ω	½	23X20X121K	BTS-120	
R15	1.5Meg	½	23X20X155K		
R16	1.5Meg	½	23X20X155K		
R17	1000Ω	½	23X20X102K	BTS-1000	
R18	470KΩ	½	23X20X474K	BTS-470K	
R19	470KΩ	½	23X20X474K	BTS-470K	
R20	4700Ω	½	23X20X472K	BTS-4700	
R21	1Meg	½	23X20X105K	BTS-1Meg	
R22	750KΩ 5%	½		BTS-750K 5%	
R23	470Ω	½	23X20X471K	BTS-470	
R24	10KΩ	½	23X20X103K		
R25	220KΩ	½	23X20X224K		
R26	15KΩ	½	23X20X153K		
R27	8200Ω	½	23X20X822K		
R28	2700Ω	½		BTS-2700	
R29	100KΩ	½	23X20X104K	BTS-100K	
R30	2200Ω	1	23X30X222K	BTA-2200	Note 2
R31	1200Ω	½	23X20X122K	BTS-1200	Note 2
R32	220Ω	½	23X20X221K	BTS-220	Note 2
R33	220Ω	½	23X20X221K	BTS-220	
R34	1000Ω	½	23X20X102K	BTS-1000	
R35	6800Ω	½	23X20X682K	BTS-6800	
R36	470Ω	½	23X20X471K	BTS-470	
R37	100Ω	½	23X20X101K	BTS-100	
R38	47Ω	½	23X20X470K	BTS-47	
R39	1000Ω	½	23X20X102K	BTS-1000	
R40	22KΩ	½	23X20X223K		
R41	470Ω	½	23X20X471K	BTS-470	
R42	100Ω	½	23X20X101K	BTS-100	
R43	47Ω	½	23X20X470K	BTS-47	
R44	15KΩ	½	23X20X153K		
R45	470Ω	½	23X20X471K	BTS-470	
R46	150Ω	½	23X20X151K	BTS-150	
R47	3300Ω	½	23X20X332K	BTS-3300	
R48	5600Ω	½	23X20X562K	BTS-5600	
R49	1.5Meg	½	23X20X155K	BTS-1.5Meg	
R50	390KΩ	½	23X20X394K	BTS-390K	
R51	22KΩ	1	23X30X223K	BTA-22K	
R52	1.5Meg	½	23X20X155K	BTS-1.5Meg	
R53	2.2Meg	½	23X20X225K	BTS-2.2Meg	
R54	1Meg	½	23X20X105K	BTS-1Meg	
R55	220Ω	½	23X20X221K	BTS-220	
R56	220Ω	½	23X20X221K	BTS-220	Note 2
R57	15KΩ	2	23X40X153K	BTB-15K	
R58	150Ω	½	23X20X151K	BTS-150	
R59	15KΩ	½	23X20X153K	BTS-15K	

Note 1. Mfgr. states to use exact replacement
Note 2. Not used in some versions.
Note 3. In some versions a 270Ω ½W resistor i
Note 4. Used only with metal picture tube, or

TRANSFORMI

ITEM No.	RATING PRI.	RATING SEC. 1	RATING SEC. 2	Hallicrafters PART No.	Halldorso PART No
T1	117VAC ⓐ .63A tap ⓐ 12VAC ⓐ .6A Tap ⓐ 6.3VAC ⓐ 7.1A			52C258 52D290 ①	

① Used in models with 6SN7 sync tube.

TRANSFORMERS

ITEM No.	USE	Hallicrafters PART No.	Halldorson PART No.	Mer PART
T2	Vert. Osc. Trans.	55B190	B6702	A-300
	Horiz. Output Trans.	55D223① ③ or		HVO- ⑥
T3		55D235② ③		HVO- ⑥
		55D197④ ⑤ ⑥		HVO-
T4	Vert. Output Trans.	55C192	Z1900⑧ ⑨	A-282
T5A	Yoke-Horiz. (27MH)	53C303	DF603 ⑬ ⑭	MDF- ⑬
B	Vert. (3.1MH)	53A271④ 53C320 ⑪ 21C158 ⑫		
T6	Width Coil (5-14MH)	51B1788③ or 51B1835 ③	RF800 ⑮	MWC-

① May be used with either 51B1788 or 51B1835 width coil.
② May be used with 51B1788 width coil only.
③ Used in all but chassis C1300D and D1300D.
④ Used in chassis C1300D and D1300D only.
⑤ Includes R8, horizontal centering control.
⑥ Variable core unit. Use of width coil not necessary.
⑦ Requires alteration of width control shaft, to fit original ext
⑧ Use 44 to 1 turns ratio.
⑨ Connect as auto transformer.
⑩ Drill new mounting hole(s).
⑪ Used in chassis H1300D and J1300D only.
⑫ Yoke rear cover and centering device used in all but chassis
⑬ Use original rear cover and centering device.
⑭ Use original yoke damping network.
⑮ Connect to terminals #1 and #2.
⑯ Connect to coded red and blue terminals.

CAPACITORS (cont)

ITEM No.	RATING CAP	VOLT.	REPLACEMENT DATA Hallicrafters Part No.	CENTRALAB Part No.	ERIE Part No	MALLORY Part No	NOTES
C83	5000		47A188	DD-502	831-000	DC-525	
C84	34		47CA40A340J				
C85	1000		47B230	DD-102	801-001	DC-521	
C86	630		47B330				
C87	1000		47A230	DD-102	801-001	DC-521	
C88	24		47CA20A240J				
C89	650		47A219				Note 3
C90	1000		47B230	DD-102	801-001	DC-521	
C91	1000		47A330	DD-103	801-001	DC-521	
C92	1000		47B330	DD-103	801-001	DC-521	
C93	10		47CA201D0F	D6-100	GPUE-100	UC-541	
C94	4.7		47A180-8	TCZ-4R7	RPUA-4R7	ZT-5547	
C95	.8	25	47A177				
C96	.05	300	47AU503J	DF-503		PT415	
C97	.1	400	47A1047	DF-104		PT401	
C98	30		47X250J300K				
C99	.1	400	47A1047	DF-104		PT401	
C70	2.2		47A180-4				Note 3
C71	68		47X207J080K				
C72A	4000		47A218	D6-402	822-004	DCD-536	
B	4000			D6-402			
C73	330		47C303S1M	D6-331	GP3K-331	UC-5333	
C74	1000		47A330	DD-103	801-001	DC-521	
C75	5000		47A188	DD-503	811-005	DC-525	
C76	5000		47A188	DD-502	811-005	DC-525	
C77	10000		47A234	DD-103	811-01	DC-521	
C78	.05	600	47AU503J	DF-503		PT415	
C79	.02	600	47A13032	DF-303	817-02	PT412	
C80	1000		47A230	DD-102	801-001	DC-521	
C81	220		47CA2021K	D6-221	GP2K-331	UC-5322	
C82	.005	600	47A2502J	D6-502	GP3-333-502	PT425	
C83	33		47CA20330M	D6-330	GP1K-330	UC-5422	
C84	.05	600	47AW503J	DF-503		PT415	
C85	.0047	400	47AW472J	D6-472	GP3-333-472	PT2347	
C86	.0047	400	47AW472J	D6-472	GP3-333-472	PT2347	
C87	.01	400	47AW103J	D6-103	GP3-333-103	PT411	
C88	470	500	47X350J471K	D6-471	811-471	MCB245	
C89	.047	400	47AW473J	DF-503		PT1447	
C90	.047	400	47AW473J	DF-503		PT1447	
C91	5000		47A188	DD-502	811-005	DC-525	
C92	5000		47A188	DD-502	811-005	DC-525	
C93	24		47CA20A102M	D6-102	GP2L-102	UC-521	
C94	1000		47CA20A102M	D6-102	GP2L-102	UC-521	
C95	.1	400	47AU1047	DF-104		PT401	
C96	.003	600	47AW302J				Note 3
C97	.01	400	47AW103J	D6-103	GP3-333-103	PT411	
C98	.01	400	47AW103J	D6-103	GP3-333-103	PT411	Note 2
C99	3900	500				MCB463	
C100	390	500	47X20D39IK	D6-391	811-391	MCB243	
C101	390	500	47X20D39IK	D6-391	811-391	MCB243	
C102	5000		47A188	DD-502	811-005	DC-525	
C103	.1	600	47BD14L8	DF-104		PT601	
C104	1000		47A230	DD-102	801-001	DC-521	
C105	.1	600	47BS104L8	DF-104		PT601	
C106	47	3000		DD30-470	3KV-470	DC30447	
C107	500	2000	47A308	TV3-502	413	HV2000S5A	Note 4

Note 1. Not used in some versions.
Note 2. When C97 is .02MFD (part #46AW203J), C98 is not used.
Note 3. Mfgr. recommends exact replacement.
Note 4. Used only with metal picture tube, or when a glass picture tube doesn't have an outer coating.

CONTROLS

ITEM No	RATING RESISTANCE	WATTS	REPLACEMENT DATA Hallicrafters Part No.	CENTRALAB Part No.	CLAROSTAT Part No.	IRC Part No.	MALLORY Part No.	INSTALLATION NOTES
R1A	1000Ω		25B1056	F1-5	RTV-531	QJ-510**	UF15R	Consrast (Panel)
B	1Meg			R2-52			UR18A ††	Volume (Rear) Attach to R1A.
C	Switch			KB-1			US-26	Attach to R1B.
R2A	120KΩ		25B1045	F1-30+		QJ-812††	UF7531-A	Horizontal Hold (Stop at 70KΩ) (Panel)
B	10KΩ			R2-53			UR14L	Tone (Rear) Attach to R2A.
R3A	125KΩ		25B1090			QJ-812**		Horizontal Hold (See Note 2) (Panel)
B	10KΩ							Tone (Rear)
R4A	50KΩ		25B1047	F1-29		QJ-612*	UR957	Brightness (Panel)
B	1.5Meg			R2-51				Vertical Hold (Rear) Stop at 750KΩ
R4A	5Meg		25B998	A2-86A	A47-4Meg-5A	QU-141A	U-85A	Height (Stop at 4Meg)
B	Shaft		Not Req.	AK-4	KSS-3	Not Req.	Not Req.	Attach to R4A.
R5A	750Ω		25B999	A2-85	A47-750-8	QU1-105	U-4	Vertical Linearity
B	Shaft		Not Req.	AK-1	KSS-3	Not Req.	Not Req.	Attach to R5A.
R6A	1.5Meg		25B1000	A2-76A	A47-1.5Meg-S	QU-135	U-85	Focus (See Note 2)
B	Shaft		Not Req.	AK-4	KSS-3	Not Req.	Not Req.	Attach to R6A.
R7	5Ω							Hum Balance - Note 3
R8	50Ω							Horizontal Centering - Note 4

Note 1. Used in chassis H1300D, (all runs) and J1300D, (all runs) only.
Note 2. Not used in chassis D1300D, run 3-1, E1300D (all runs) and F1300D (all runs).
Note 3. Not used in some versions (control part of speaker).
Note 4. Not used in chassis C1300D (all runs) and D1300D (all runs) only.
* Connect a 1MΩ resistor in series with the right hand terminal of the control and the lead connecting to the same terminal of the original control (control viewed from shaft end, clockwise down).
• Connect a 50KΩ resistor in series with the right hand terminal of the control and the lead connecting to the same terminal of the original control (control viewed from shaft end, terminals down.)
† Universal Replacement (Mallory Exact Duplicate Part No. UE535)
▪ Universal Replacement (Mallory Exact Duplicate Part No. UE1127)
*CONCENTRIKIT EQUIVALENT, K-5 KIT, BASE ELEMENTS AND SHAFTS, Bil-123, P1-017 (Panel) Bil-136, R2-103 (Rear)
**CONCENTRIKIT EQUIVALENT, K-5 KIT, BASE ELEMENTS AND SHAFTS, Bil-228, P1-017 Bil-116, R2-103
††CONCENTRIKIT EQUIVALENT, K-5 KIT, BASE ELEMENTS AND SHAFTS, Bil-125, P1-017 (Panel) Bil-114, R2-123 (Rear)
•*CONCENTRIKIT EQUIVALENT, K-2 KIT, BASE ELEMENTS AND SHAFTS, Bil7-108 P1-108 (Panel) Bil3-157, R2-124 (Rear) 76-1 (Switch)

PARTS LIST AND DESCRIPTIONS (Continued)

RESISTORS

ITEM No.	RATING OHMS	WATT	REPLACEMENT DATA Hallicrafters Part No.	IRC Part No.	NOTES
R9	470KΩ	1	23X20X474K	BTS-470K	
R10	470KΩ	1	23X20X474K	BTS-470K	
R11	820Ω	1	23X20X821K		
R12	6900Ω	1	23X30X682K		
R13	10KΩ	1	23X30X103K		
R14	12KΩ	1	23X30X123K	BTS-120	
R15	1.5Meg	1	23X20X155K		
R16	1.5Meg	1	23X20X155K		
R17	1000Ω	1	23X30X102K	BTS-1000	
R18	470KΩ	1	23X20X474K	BTS-470K	
R19	470KΩ	1	23X20X474K	BTS-470K	
R20	4700Ω	1	23X20X472K	BTS-4700	
R21	1Meg	1	23X20X105K	BTS-1Meg	
R22	750KΩ 5%			BTS-750K 5%	
R23	47KΩ	1	23X20X473K	BTS-470	
R24	100KΩ	1	23X20X104K		
R25	220KΩ	1	23X20X224K		
R26	15KΩ	1	23X20X153K		
R27	8200Ω	1	23X20X822K		
R28	2700Ω	1		BTS-2700	
R29	100KΩ	1	23X20X104K	BTS-100K	
R30	2200Ω	1	23X30X222K	BTA-2200	Note 2
R31	1200Ω	1	23X20X122K	BTS-1200	Note 2
R32	220Ω	1	23X20X221K	BTS-220	Note 2
R33	230Ω	1	23X20X231K	BTS-230	
R34	1000Ω	1	23X20X102K	BTS-1000	
R35	6800Ω	1	23X30X682K	BTS-6800	
R36	470Ω	1	23X20X471K	BTS-470	
R37	1000	1	23X20X102K	BTS-1000	
R38	47Ω	1	23X20X470K	BTS-47	
R39	1000Ω	1	23X30X102K	BTS-1000	
R40	220KΩ	1	23X20X224K		
R41	470Ω	1	23X20X471K	BTS-470	
R42	100Ω	1	23X20X101K	BTS-100	
R43	47Ω	1	23X20X470K	BTS-47	
R44	15KΩ	1	23X20X153K		
R45	470Ω	1	23X20X471K	BTS-470	
R46	150Ω	1	23X20X151K	BTS-150	
R47	330Ω	1	23X20X331K	BTS-330	
R48	5600Ω	1	23X20X562K	BTS-5600	
R49	1.5Meg	1	23X20X155K	BTS-1.5Meg	
R50	3901KΩ	1	23X20X394K	BTS-390K	
R51	22KΩ	1	23X30X223K	BTA-22K	
R52	1.5Meg	1	23X20X155K	BTS-1.5Meg	
R53	2.2Meg	1	23X20X225K	BTS-2.2Meg	
R54	1Meg	1	23X20X105K	BTS-1Meg	
R55	330Ω	1	23X20X221K	BTS-330	
R56	220Ω	1	23X20X221K	BTS-220	Note 2
R57	15KΩ	1	23X40X153K	BTS-15K	
R58	150Ω	1	23X20X151K	BTS-150	
R59	15KΩ	1	23X30X153K	BTS-15K	

ITEM No.	RATING OHMS	WATT	REPLACEMENT DATA Hallicrafters Part No.	IRC Part No.	NOTES
R60	100KΩ	1	23X20X104K	BTS-100K	
R61	2200Ω	1	23X20X222K	BTS-2200	
R62	150Ω	1	23X20X151K	BTS-150	
R63	270Ω	1	23X20X271K	BTS-270	
R64	10KΩ 5%	1	23X30X103J	BTS-10K 5%	Note 1
R65	10KΩ 5%	1	23X30X103J	BTS-10K 5%	Note 1
R66	33KΩ	1	23X20X333K	BTS-33K	
R67	10Meg	1	23X30X106K	BTS-10Meg	
R68	33KΩ	1	23X20X333K	BTS-33K	
R69	1200Ω	1	23X20X122K	BTS-1200	
R70	470KΩ	1	23X20X474K	BTS-470K	
R71	8200Ω	2	23X40X822K	BTS-8200	
R72	10KΩ	2	23X40X103K	BTS-10K	
R73	10KΩ	2	23X30X103K	BTS-10K	
R74	470KΩ	1	23X20X474K	BTS-470K	
R75	2.2Meg	1	23X20X225K	BTS-2.2Meg	
R76	820KΩ	1	23X20X824K	BTS-820K	
R77	560KΩ	1	23X20X564K	BTA-560K	
R78	47KΩ	1	23X30X473K	BTS-47K	
R79	2200Ω	1	23X20X222K	BTS-2200	
R80	10KΩ	1	23X30X103K	BTA-10K	
R81	6800Ω	1	23X20X682K	BTS-6800	
R82	2200Ω	1	23X20X222K	BTS-2200	
R83	22KΩ	1	23X30X223K	BTA-22K	
R84	33KΩ	1	23X20X333K	BTS-33K	
R85	10KΩ	1	23X30X103K	BTS-10K	
R86	3300Ω	1	23X20X332K	BTS-3300	
R87	1800Ω	1	23X20X182K	BTS-1800	
R88	120Ω	1	23X20X121K	BTS-120	Note 2
R89	8700Ω	5	24A971		Note 1
R90	10KΩ	1			Note 3
R91	560Ω	1			Note 3
R92	100KΩ	1	23X20X104K		
R93	100KΩ	1	23X20X104K		
R94	4.7Meg	1	23X20X475K		
R95	4.7Meg	1	23X20X475K		
R96	2200Ω	1	23X20X222K		
R97	1500Ω 5%	1	23X20X152J		
R98	33KΩ	1	23X20X333K		
R99	100KΩ	1	23X20X104K		
R100	10KΩ	1	23X30X103K	BTS-10K	
R101	4700Ω	1	23X20X472K		
R102	470KΩ	1	23X20X474K		
R103	8200Ω	2	23X40X822K		
R104	15Ω	1	23X20X150K		
R105	5.3Ω	5		BW-3.3	
R106	2.5Ω	5	25B1011		
R107	2.2Ω 5%	1	23X30X022K		Note 2
R108	47Ω	1	23X30X470K		Note 2
R109	1Meg	1	23X30X105K		Note 4

Note 1. Mfgr. states to use exact replacement only.
Note 2. Not used in some versions.
Note 3. In some versions a 270Ω ½W resistor is used in this application.
Note 4. Used only with metal picture tube, or when a glass picture tube doesn't have an outer coating.

TRANSFORMER (FILAMENT)

ITEM No.	RATING PRI.	SEC 1	SEC 2	REPLACEMENT DATA Hallicrafters Part No.	Halldorson Part No.	Merit Part No.	RCA TYPE No	Stancor Part No.	Thordorson Part No	Triad Part No
T1	117VAC			52C258						
	④ .83A			52D390 ①						
	tap ⑤ 12VAC									
	⑥ .8A									
	Tap ⑤ 6.3VAC									
	⑥ 7.1A									

① Used in models with 6SN7 sync tube.

TRANSFORMERS (SWEEP CIRCUITS)

ITEM No.	USE	REPLACEMENT DATA Hallicrafters Part No.	Halldorson Part No.	Merit Part No.	RCA TYPE No.	Ram Part No	Stancor Part No	Thordorson Part No	Triad Part No.
T2	Vert. Osc. Trans. Horiz. Output Trans.	55B190 55D223 ③	B6702	A-3006 HVO-39* ⑫	V405 XL10 ⑦	A-8125 A-8248 * ⑦	26A03 FLY-57 * ⑦	A-97X	
T3		55D236 ② ③		HVO-39 * ⑫	XL10 ⑦	A-8248 * ⑦	FLY-57 * ⑦		
		55D187 ④ ⑤ ⑫		HVO-39 *	XL10 *	A-8248 *	FLY-57 *		
T4 T5A	Vert. Output Trans. Yoke-Horiz. (STMD)	55C182 53C060 ⑭	Z1900 ⑬ DF60 ⑬	A-3025 MDF-74 ⑭ ⑮	214D1 ⑮	V306 ⑬ ⑭ V70F23 ⑬ ⑮	A-8140 ⑬ ⑭ DY-10A ⑮	26S57 ⑬ ⑭ Y-U ⑬ ⑮	A-110X ⑭ Y-30 ⑭
B	Vert. (3.1MΩ)	53A271 ⑥ 53C320 ⑭ 21C158 ⑭							
T6	Width Coil (5-14MH)	51B1788 ⑦ or 51B1635 ⑦	R7800 ⑯	MWC-11	212R1 ⑯	20IR15	WC-5 ⑯	WC-18	WC-13 ⑯ ⑰

① May be used with either 51B1788 or 51B1635 width coil.
② May be used with 51B1788 width coil only.
③ Used in all but chassis C1300D and D1300D.
④ Used in chassis C1300D and D1300D only.
⑤ Includes R6, horizontal centering control.
⑥ Variable core unit. Use of width coil not necessary.
⑦ Requires alteration of width control shaft, to fit original extension shaft.
⑧ Use 44 to 1 turns ratio.
⑨ Connect as auto transformer.
⑩ Drill new mounting hole(s).
⑪ Used in chassis H1300D and J1300D only.
⑫ Yoke rear cover and centering device used in all but chassis E1300D and F1300D.
⑬ Use original rear cover and centering device.
⑭ Use original yoke damping network.
⑮ Connect to terminals #1 and #2.
⑯ Connect to coded red and blue terminals.

*HORIZONTAL OUTPUT TRANSFORMER CONNECTION DATA

Use Original Width Coil Unless Replacement Type Is Listed

ORIGINAL TERMINAL (CONNECTIONS	Halldorson Replacement Connections	Merit Replacement Connections	RCA Replacement Connections	Ram Replacement Connections	Stancor Replacement Connections	Thordorson Replacement Connections	Triad Replacement Connections
6 5		6 5		6 6	6 6	6 6	
4 3		4 Jumper 4 & 3		5 Jumper 5 & 4	4 Jumper 4 & 3	4 Jumper 4 & 3	4 Jumper 4 & 3
3 3		3 4 & 3		4 Jumper 4 & 3	3 4 & 3	3 4 & 3	
2 2		2 2		3 3	2 2	2 2	
1 1		1 1		2 or 1 2 or 1	1 1	1 1	
Connect Width Coil Across	2 & 1						
Special Notes							

Connections for part #55D197.
Connections for part #55D223 and 55D235.

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	IMPEDANCE PRI.	SEC.	REPLACEMENT DATA Hallicrafters Part No.	Halldorson Part No.	Merit Part No.	Stancor Part No.	Thordorson Part No	Triad Part No	NOTES
T7	3.6KΩ	3.7Ω	55B191 52C194 ①	Z1111	A-3938	A-3976	34B50	S-1X	① Alternate audio output

SPEAKER

ITEM No.	RATINGS SIZE	FIELD	V	C	IMP	REPLACEMENT DATA Hallicrafters Part No.	QUAM Part No	NOTES
SP1	5"	PM	3.7Ω			85C150	5A07	① Used in models 17K1309M, 17X1109, & 21K141M
	8"	61Ω	3.7Ω			85A133 ①	8R12	

COILS (RF-IF)

ITEM No.	USE	DC RES. PRI.	DC RES. SEC.	REPLACEMENT DATA Hallicrafters Part No.	MEISSNER Part No.	MERIT Part No.	MILLER Part No	NOTES
L1	UHF Ant. Coil	0Ω						
L2	UHF Ant. Coil	0Ω						
L3	Fil. Choke	0Ω						
L4	Fil. Choke	0Ω						
L5	Cathode Choke	0Ω						
L6	UHF Osc. Coupling Coil	0Ω						
L7	UHF Osc. Coupling Coil	0Ω						
L8	UHF IF Output	0Ω		18A294				Tapped
L9	UHF IF Input	0Ω		51A1761				
L10	Feedback Coil	1.3Ω		51A1755				
L11	Trap Coil			51A1757				
L12	UHF IF Output			51A1759				
L13	VHF Ant. Trans.	.1Ω	0Ω	51A1684				
L14	VHF Ant. Coils	0Ω		60A554				
L15	VHF Ant. Coil	0Ω		60A554				Channel 13
L16	Fil. Choke	0Ω		53A296				
L17	Neut. Coil	0Ω		51A1690				
L18	VHF IF Coil	0Ω		51A1685				Channel 13
L19	VHF RF Coils	0Ω		60A555				
L20	VHF Mixer Grid Coils	0Ω		12A127				
L21	VHF Mixer Grid Coil	0Ω		51A1686				Channel 13
L22	Feedback Coil	1.5Ω						
L23	Fil. Choke	0Ω		53A297				
L24	VHF Osc. Coils	0Ω		12A128				
L25	VHF Osc. Coil	0Ω		12A147				Channel 6
L26	VHF Osc. Coil	0Ω		12A146				Channel 13-tapped
L27	Conv. Plate	.1Ω		12A148				
L28	UHF IF Coil	0Ω						
L29	1st. Video IF	0Ω		51B1643	17-5001 *	TV-125 *	6331 *	
L30	Fil. Choke	0Ω		53A282	19-3001		6175	.4 Microhenry
L31	2nd. Video IF	0Ω		50B573	17-5003 ▪	TV-128 ▪	6333 ▪	
L32	Fil. Choke	0Ω		53A282	19-3001		6175	.4 Microhenry
L33	3rd. Video IF	0Ω		50B574	17-5002 ▲	TV-127 ▲	6332 ▲	Includes 41.25MC trap
L34	4th. Video IF	.1Ω		50B575	17-5004 ▪	TV-126 ▪	6334 ▪	
L35	Series Peaking Coil	4.4Ω		53A307	19-1006		4634	18 Microhenries
L36	Series Peaking Coil	5Ω		51B1708	19-3100		6131	125 Microhenries
L37	Shunt Peaking Coil	1Ω		51B1710	19-3500		6138	470 Microhenries
L38	Series Peaking Coil	1.1Ω		53A304	19-1003		4698	4.1 Microhenries
L39	Series Peaking Coil	8Ω		51B1711	19-3300 ▪		6135 ▪	306 Microhenries, wound on 22KΩ resistor
L40	4.5MC Trap	2Ω		51B1541	20-1004	TV-151	1468	
L41	Series Peaking Coil	9.3Ω		51B1712	19-1923	TV-180	6132	343 Microhenries
L42	Shunt Peaking Coil	17Ω		51B1713	19-4940		6136 ▪	890 Microhenries, wound on 3.3KΩ resistor
L43	Sound IF	1.1Ω		51B1543	17-3400	TV-151	1469	
L44	Ratio Det.	3.8Ω	.6Ω CT	50B473	17-3033	TV-115	1458	Tertiary winding-.5Ω
L45	Horiz. Osc.	47Ω		51B1643	19-1576	TV-153	6210	
L46	RF Choke	4.4Ω		53A307	19-1006		4634	18 Microhenries

* Cut out chassis hole and use adaptor plate. Use one winding.
■ Detune trap and use one winding. Use adaptor plate.
▲ Use one winding and use adaptor plate.
▪ Use adaptor plate.
• Parallel with 22KΩ resistor.
† Parallel with 3.3KΩ resistor.

HALLICRAFTERS MODELS 17K1108, M. 17K1118, M. 17T1108, M. 17T1108, M. 17T1108, M. 17T1118, M. 17T1118, M. 17T1118

PARTS LIST AND DESCRIPTIONS (Continued)

FILTER CHOKE

ITEM No.	RATINGS			REPLACEMENT DATA					
	TOTAL DIRECT CURRENT	D. C. RESISTANCE	INDUCTANCE @ CURRENT 1000 ~	Hallicrafters PART No.	Halldorson PART No.	Merit PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.
L47	.210ADC	59Ω	1.2 Hy.	Part of Spkr.					

SELENIUM RECTIFIER

ITEM No.	RATING	REPLACEMENT DATA						NOTES
	CURRENT	Hallicrafters PART No.	FEDERAL PART No.	INTERNATIONAL PART No.	MALLORY PART No.	RADIO RECEPTOR PART No.	SARKES TARZIAN PART No.	
M1	.210ADC	27A173	1236A	RS-250	6S300	6Q4	300	
M2	.210ADC	27A173	1236A	RS-250	6S300	6Q4	300	

CRYSTAL DIODES

ITEM No.	ORIG TYPE	REPLACEMENT DATA		NOTES
		Hallicrafters PART No.	SYLVANIA PART No.	
M3	1N82 *	121A339	1N82/1N172	UHF Mixer
M4	1N64	19B1864	1N60/1N132	Video Detector

* Some versions may use crystal diode type K3 in this application.

MISCELLANEOUS

ITEM No.	PART NAME	Hallicrafters PART No.	NOTES
M5	Dial Light	39A004	#47 - UHF Dial - Chassis B1300D, F1300D, D1300D, H1300D
M6	Tuner	1C1717	VHF - Chassis B1300D (Runs 1, 2), D1300D (Runs 2, 3, 3-1), F1300D (Runs 1, 2, 2-2), H1300D (Runs 2, 2-2, 2B-2)
	Tuner	1E1852	VHF - Chassis A1300D (Runs 1, 1-2), C1300D (Run 2), E1300D (Runs 1, 1-2), J1300D (Runs 1, 1-2, 1B, 1B-2)
	Tuner	1E1846	VHF - Chassis A1300D (Runs 2, 2-2), C1300D (Run 3), E1300D (Runs 2, 2-2, 2B-2), J1300D (Runs 1A, 1A-2, 1AB, 1AB-2)
	Tuner	1E1718	VHF - Chassis C1300D (Run 1)
	Tuner	1E1670	VHF - Used in some versions of chassis B1300D (Run 3), D1300D (Run 1), F1300D (Run 3), H1300D (Runs 1, 1-2, 1B-2, 1A, 1A-2, 1AB, 1AB-2)
	Tuner	1E1483	VHF - Used in some versions of chassis B1300D (Run 3), D1300D (Run 1), F1300D (Run 3), H1300D (Runs 1, 1-2, 1B-2, 1A, 1A-2, 1AB, 1AB-2
	Tuner	1B1969	VHF - Chassis F1300D (Runs 5, 5-2)
M7	Tuner	1E1660	UHF - Chassis B1300D (Runs 1, 3), D1300D (Runs 1, 2), F1300D (Runs 1, 3, 5, 5-2), H1300D (Runs 1, 1-2, 1B-2)
	Tuner	1E1855	UHF - Chassis B1300D (Run 2), D1300D (Runs 3, 3-1), F1300D (Runs 2, 2-2), H-1300D (Runs 2, 2-2, 2B-2, 1A, 1A-2, 1AB, 1AB-2)
M8	Switch	60B507	AGC
M9	Switch	60C576	VHF-UHF - Chassis B1300D, F1300D, D1300D, H1300D
M10	Focus Magnet	21C161	Includes centering device - Chassis E1300D, F1300D and D1300D (Run 3-1)
M11	Centering Device	21C158	Chassis A1300D, B1300D, C1300D, D1300D (Runs 1, 2, 3), H1300D, J1300D
M12	Ion Trap	21A145	Chassis A1300D, B1300D, C1300D, D1300D, H1300D, J1300D
	Ion Trap	21A146	Chassis E1300D, F1300D
	Knob	15C665	VHF channel selector - Chassis C1300D (Run 1)
	Knob	15C645	VHF channel selector - Chassis C1300D (Runs 2, 3), A1300D (Runs 1, 1-2, 2, 2-2), E1300D (Runs 1, 1-2, 2, 2-2, 2B-2), J1300D (Runs 1, 1B, 1AB, 1-2, 1A-2, 1AB-2, 1B-2), F1300D (Runs 1, 2, 2-2, 3, 5, 5-2), B1300D (Runs 1, 2, 3), D1300D (Runs 1, 2, 3, 3-1), H1300D (Runs 1, 1A, 1AB, 1-2, 1A-2, 1AB-2, 1B-2, 2, 2-2, 2B-2)
	Knob	15C641	VHF fine tuning & UHF tuning - Ch. B1300D (Runs 1, 2, 3), D1300D (Runs 2, 3, 3-1, 1), F1300D (Runs 1, 2, 2-2, 3, 5, 5-2), H1300D (Runs 2, 2-2, 2B-2, 1, 1-2, 1B-2, 1A, 1A-2, 1AB, 1AB-2)
	Knob	15C641	VHF Fine tuning - Ch. A1300D, C1300D, E1300D, J1300D
	Knob	15C642	Contrast
	Knob	15A562	AGC switch
	Knob	15C644	On-off-volume
	Knob	15C566	UHF-VHF switch - Chassis B1300D, F1300D, D1300D, H1300D
	Knob	15A648	Brightness & horizontal hold - Ch. A1300D, E1300D, B1300D, F1300D, C1300D, D1300D
	Knob	15A494	Brightness & horizontal hold - Ch. J1300D, H1300D
	Knob	15A649	Tone & vert. hold - Ch. A1300D, E1300D, B1300D, F1300D, C1300D, D1300D
	Knob	15A495	Tone & vert. hold - Ch. J1300D, H1300D
	Scale	83C458	UHF Dial (Tuner part #1E1660) - Ch. B1300D, F1300D, D1300D
	Scale	83C440	UHF Dial (Tuner part #1E1660)-Ch. H1300D
	Scale	83C460	UHF Dial (Tuner part #1E1855)-Ch. B1300D, F1300D, D1300D
	Scale	83C483	UHF Dial (Tuner part #1E1855) - Ch. H1300D
	Safety Glass	22A400	17" Picture tubes
	Safety Glass	22D401	21" Picture tubes
	Mask	7A495	17" Picture tubes
	Mask	7D492	21" Picture tubes

COMPARISON OF 1300D SERIES CHASSIS (CONT.)

MODIFICATION IV

LOCATION OF CHANGE	CHANGE MADE
A. Tuner	A. UHF tuner part #1E1660 added.

MODIFICATION V

LOCATION OF CHANGE	CHANGE MADE
A. Tuner	A. UHF tuner changed to part #1E1855.

MODIFICATION VI

LOCATION OF CHANGE	CHANGE MADE
A. Tuner B. lst. Video IF Coupling	A. VHF tuner changed to part #1E1718. B. C49 added from L29 to terminal #1 of tuner.

MODIFICATION VII

LOCATION OF CHANGE	CHANGE MADE
A. Horizontal Output Stage	A. T3 changed to part #55D197. With this change R8 is added and R105 is decreased from 3.3Ω to 2.2Ω.
B. Horizontal Output Stage	B. A .1MFD,200V capacitor shunted by a coil (part #53B264) added from terminal #4 of T3 to terminal #3 of T5.
C. Deflection Yoke	C. T5 changed to part #53A271.
D. Pins 5 and 7 of V15.	D. R104 and C95 are omitted.
E. Pins 5 and 7 of V15.	E. The connection from pin 5 of V15 to terminal #1 of T5 is removed.
F. Pin 10 of V20	F. The connection from pin 10 of V20 to terminal #6 of T5 is removed.
G. Terminal #1 of T5.	G. Terminal #1 of T5 is connected to pin 10 of V20 and high side of R6.
H. Pins 5 and 7 of V15	H. A 22KΩ resistor added from pins 5 and 7 of V15 to ground.
I. Pins 5 and 7 of V15.	I. A .006MFD, 600V capacitor added from pins 5 and 7 of V15 to ground.
J. Pins 5 and 7 of V15.	J. A .0047MFD, 1000V capacitor and a 33KΩ, 1 watt resistor are connected in series from pins 5 and 7 of V15 to terminal #2 of T3.
K. Grid of horizontal MV (Pin 1 of V16)	K. R98 is decreased from 33KΩ to 8.2KΩ.
L. Terminal #1 of T3.	L. A 180KΩ resistor is added from terminal #1 of T3 to R99.
M. Pin 2 of V16	M. R99 is increased from 100KΩ to 220KΩ.
N. Horizontal MV plate	N. A .1MFD 600V capacitor added from the junction of R99 and the 180KΩ resistor to ground.
O. Horizontal Output coupling (Pin 5 of V17)	O. C102 is decreased from 5000MMF to 560MMF.
P. Horizontal Peaking	P. R100 is decreased from 10KΩ to 8.2KΩ.
Q. Horizontal Output Screen (Pin 4 of V17)	Q. R103 is increased from 8.2KΩ to 10KΩ.
R. Damper tube (V18).	R. Pins 3 and 8 of V18 are tied together.
S. Pin 4 of V16.	S. C97 is decreased from .02MFD, 400V to .01MFD 400V..
T. Horizontal Output Screen (Pin 4 of V17)	T. C103 is decreased from .1MFD, 600V to .047MFD 400V.
U. Pin 5 of V16	U. R96 is decreased from 8.2KΩ to 5.6KΩ.
V. Grid of Horizontal Output (Pin 5 of V17).	V. R102 is decreased from 470KΩ to 390KΩ.

PROPERTY OF
L. F. BLANKENSHIP
DENVER, COLORADO

MODIFICATION VIII

LOCATION OF CHANGE	CHANGE MADE
A. Tuner	A. VHF tuner (1E1852) is replaced by sixteen position tuner part #1E1670 or 1E1483.
B. lst. Video IF Coupling.	B. C49 added from L29 to terminal #1 of tuner.

MODIFICATION IX

LOCATION OF CHANGE	CHANGE MADE
A. Picture tube.	A. Picture tube changed from a 17HP4 to a 21AP4.
B. Pin 7 of HV Rectifier	B. The high voltage lead (pin 7 of V19) is connected to a 1Meg 1 watt resistor (R109) and the resistor is connected to the metal cone of the 21AP4.
C. Pin 7 of HV Rectifier	C. A 500MMF, 20,000V capacitor is connected from pin 7 of V19 to ground.
D. Picture Tube	D. Picture tube socket 6A465 is replaced by socket 6A484 with wire to pin 6 omitted.
E. Focus Control	E. R6, focus control is omitted.

MODIFICATION X

LOCATION OF CHANGE	CHANGE MADE
A. Tuner	A. VHF tuner (1E1852) is replaced by tuner 1B1969.
B. lst. Video IF Coil	B. L29 is changed to part #51B1841.
C. lst. Video IF Coupling	C. C49 is added from L29 to pin 1 of V5.

HALLICRAFTERS MODELS 17K110B, M, 17K111B, M, 17T100B, M, 17T101B, M, 17T170B, M, 17T171B, M, 21K140B, M, 21K141B, M, 21K150M, 21K151M, 21T120B, M, 21T121B, M, 21T160B, M, 21T161B, M (Ch. A1300D, B1300D, C1300D, D1300D, E1300D, F1300D, H1300D, J1300D)

COMPARISON OF 1300D SERIES CHASSIS (CONT.)

MODIFICATION XI

LOCATION OF CHANGE	CHANGE MADE
A. Filament transformer B. Sync separator and sync phase inverter (V13). C. Cathode of horizontal output (Pin 8 of V17).	A. T1 changed to part #52C258. B. V13 changed to a 12SN7GT. C. R108 is omitted.

MODIFICATION XII

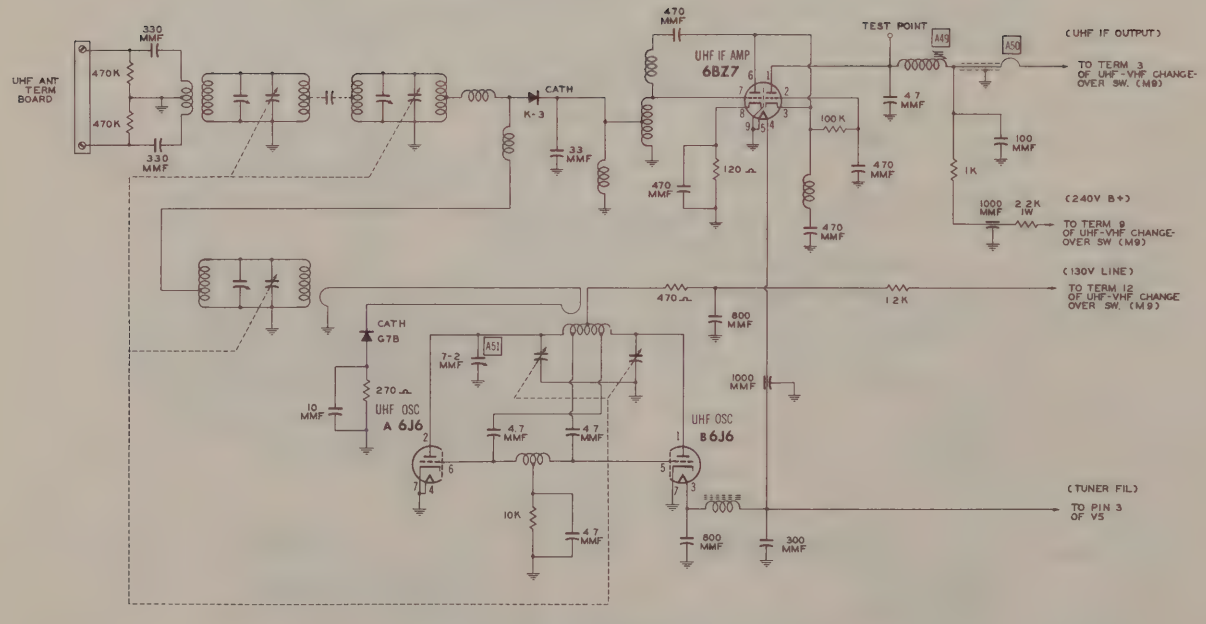
LOCATION OF CHANGE	CHANGE MADE
A. Picture Tube	A. Picture tube changed from a 17HP4 to a 21YP4.

MODIFICATION XIII

LOCATION OF CHANGE	CHANGE MADE
A. Sync Separator and Sync Phase Inverter (V13).	A. The Triode sections of V13 are reversed.

MODIFICATION XIV

LOCATION OF CHANGE	CHANGE MADE
A. Horizontal Output (Pin 5 of V17). B. Horizontal Output Screen (Pin 4 of V17). C. Pin 1 of V16 D. Horizontal Hold Control E. Deflection Yoke	A. C102 is decreased from 5000MMF to 1000MMF. B. C103 is decreased from .1MFD 600V to .047MFD 400V. C. R98 is increased from 33KΩ to 56KΩ. D. The 50KΩ stop on the horizontal hold control (R2) is omitted. E. The deflection yoke (T5) is changed to part #53C320.



UHF TUNER PART NO 1E660 USED WITH CHASSIS B1300 D RUNS 1, AND 3; B1300 D RUNS 1 AND 2 F1300 D RUNS 1, 3, 5, AND 5-2; H1300D RUNS 1, 1-2, AND 1B-2.

UHF TUNER SCHEMATIC

UHF TUNER SIDE VIEW

VHF TUNER TOP VIEW

UHF TUNER TOP VIEW

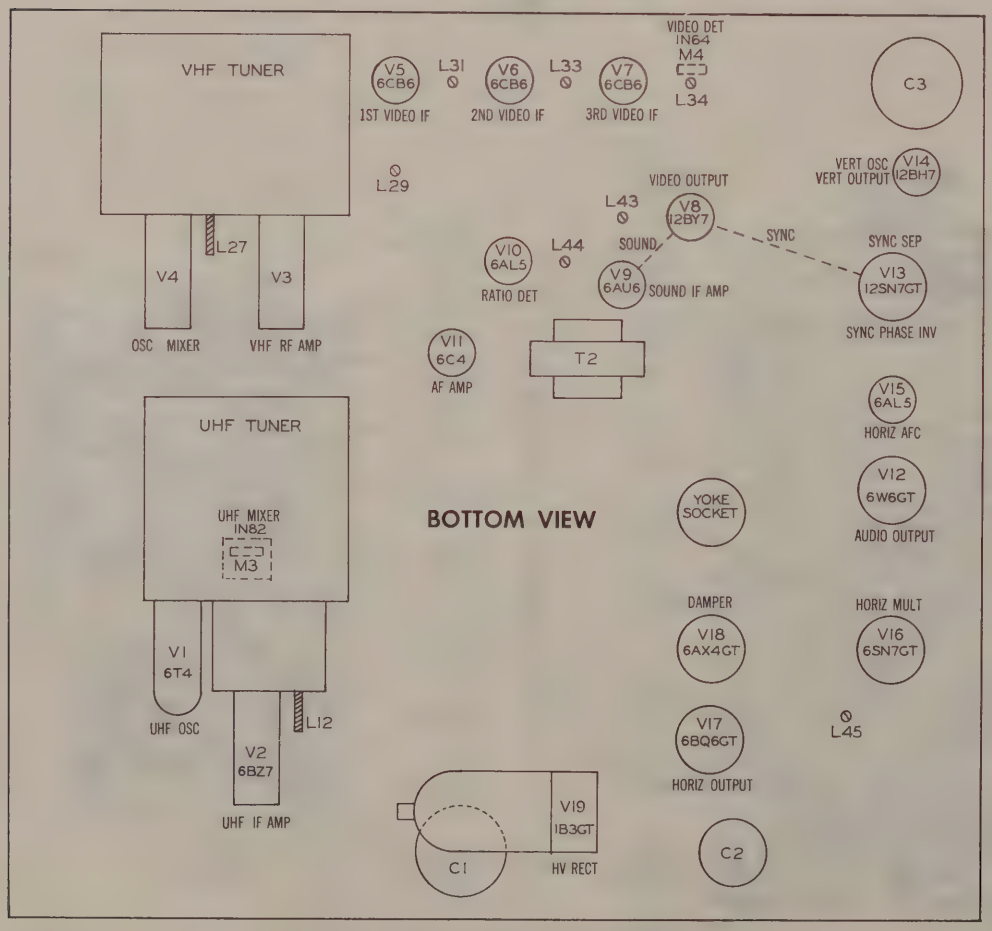
PROPERTY OF
C.F. HAMMOND
Mfg. Model #
ZURICH, COLUMBIA

HALLICRAFTERS MODELS 17K110B, M, 17K111B, M, 17T100B, M, 17T101B, M, 17T170B, M, 17T171B, M, 21K140B, M, 21K141B, M, 21K150M, 21K151M, 21T120B, M, 21T121B, M, 21T160B, M, 21T161B, M (Ch. A1300D, B1300D, C1300D, D1300D, E1300D, F1300D, H1300D, J1300D)

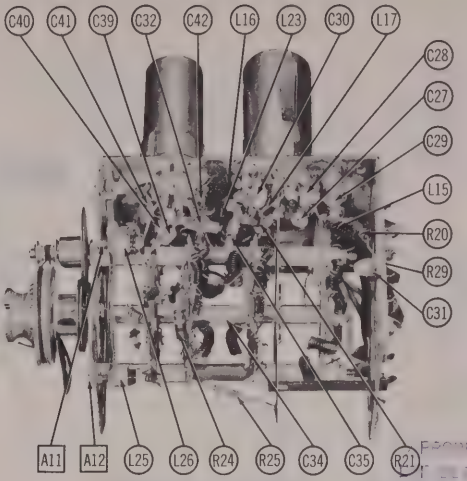
RESISTANCE MEASUREMENTS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8	Pin 9
V 1	6T4	*■7KΩ	8.2KΩ	0Ω	.1Ω	0Ω	8.2KΩ	*■7KΩ		
V 2	6BZ7	*†1.2KΩ	*850KΩ	INF	.1Ω	0Ω	INF	10KΩ	120Ω	0Ω
V 3	6BZ7	†800Ω	500KΩ	INF	.1Ω	0Ω	INF	2Meg	0Ω	0Ω
V 4	6J6	■11KΩ	■5.1KΩ	0Ω	.1Ω	220KΩ	15KΩ	0Ω		
V 5	6CB6	1.5Meg	47Ω	.1Ω	0Ω	■700Ω	■700Ω	0Ω		
V 6	6CB6	1.5Meg	47Ω	.1Ω	0Ω	■600Ω	■600Ω	0Ω		
V 7	6CB6	15KΩ	150Ω	.1Ω	0Ω	■500Ω	■500Ω	0Ω		
V 8	12BY7	220Ω	1Meg	0Ω	.1Ω	.1Ω	0Ω	†4.7KΩ	†15KΩ	0Ω
V 9	6AU6	1.1Ω	150Ω	.1Ω	0Ω	■2.2KΩ	■2.2KΩ	150Ω		
V 10	6AL5	10KΩ	10KΩ	0Ω	.1Ω	INF	0Ω	INF		
V 11	6C4	†33KΩ	NC	0Ω	.1Ω	†33KΩ	300KΩ	1.2KΩ		
V 12	6W6GT	TP	0Ω	†230Ω	†59Ω	75KΩ	TP	.1Ω	16KΩ	
V 13	12SN7GT	■2.2Meg	†820KΩ	16KΩ	47KΩ	■17KΩ	2.2KΩ	.1Ω	0Ω	
V 14	12BH7	▲3Meg	750KΩ	0Ω	0Ω	.1Ω	▲800Ω	▲3Meg	9.5KΩ	1.8Ω
V 15	6AL5	4.8Meg	4.8Meg	0Ω	.1Ω	15Ω	0Ω	15Ω		
V 16	6SN7GT	100KΩ	†100KΩ	1.5KΩ	10Meg	†13KΩ	1.5KΩ	.1Ω	0Ω	
V 17	6BQ6GT	TP	0Ω	TP	†8.2KΩ	470KΩ	NC	.1Ω	0Ω	TOP CAP ▲22Ω
V 18	6AX4GT	NC	TP	100KΩ	NC	†59Ω	NC	100KΩ	100KΩ	
V 19	1B3GT		PINS	1 - 8	HAVE	INF	RESISTANCE			TOP CAP ▲285Ω
V 20	17HP4	0Ω	17KΩ	PIN 6 25Ω	PIN 10 ▲26Ω	PIN 11 ■130KΩ	PIN 12 .1Ω			

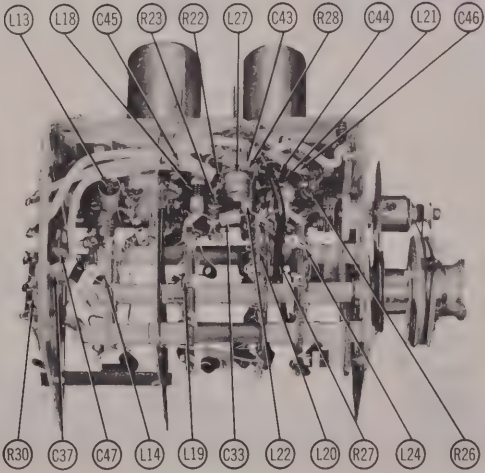
* MEASURED IN "UHF" POSITION.
■ MEASURED FROM 130V LINE.
† MEASURED FROM OUTPUT OF M2.
▲ MEASURED FROM PIN 3 OF V18.
TP - TIE POINT.
NC - NO CONNECTION.



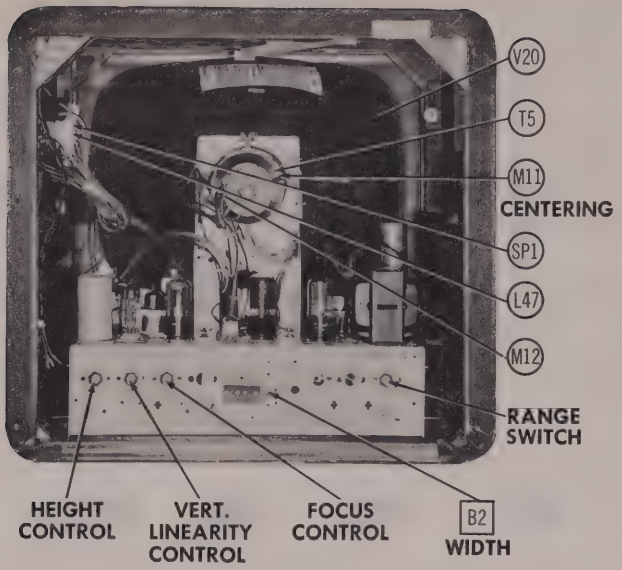
TUBE PLACEMENT CHART



VHF TUNER-RIGHT SIDE



VHF TUNER-LEFT SIDE



CABINET—REAR VIEW

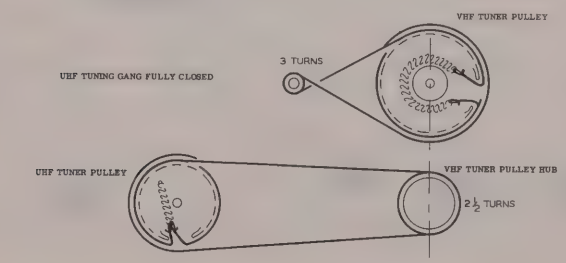
HORIZONTAL SWEEP CIRCUIT ADJUSTMENTS

Tune in a TV station, preferably a test pattern.

Set the horizontal hold control to the center of its range and adjust the horizontal stabilizer slug (B1) until the picture is in sync.

Check the sync range of the horizontal hold control for proper centering by turning the control first to one extreme, the the other of its rotation and switching off channel and back again. Turn the horizontal hold control slowly toward the center of its range and note the pull-in point of synchronization. The pull-in points from both extremes of rotation should be equal distances on each side of the mid-position. If necessary, retouch B1 for this condition.

Adjust the width slug (B2) for a picture slightly wider than necessary to fill the picture mask horizontally.



UHF DRIVE CORD STRINGING

PHOTOFACT* Folder

*TRADE MARK

RETMA MEMBER

HOFFMAN MODEL 21M1100A
(Ch. 703A-21)

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DENVER, COLORADO

MODEL 21M1100A

HOFFMAN MODEL 21M1100A
(Ch. 703A-21)

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DATE 2–56 SET 305 FOLDER 11

HOFFMAN MODEL 21M1100A (Ch. 703A-21)

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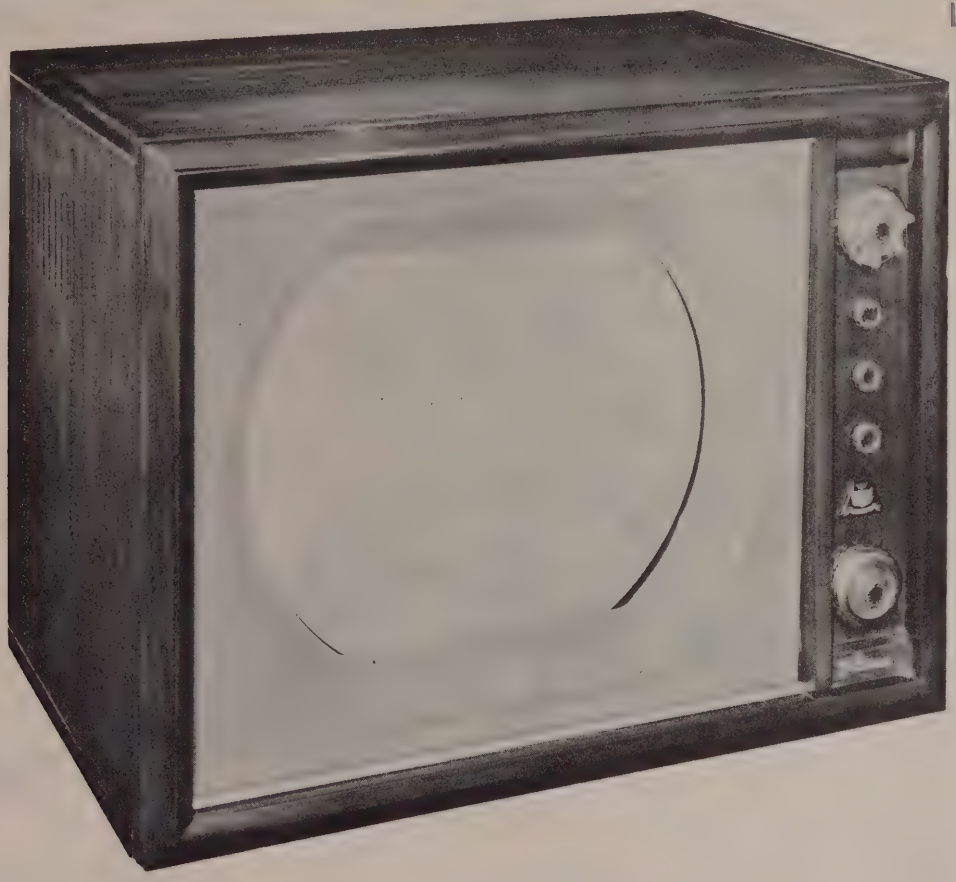

TRADE NAME	Hoffman Model 21M1100A (Ch. 703A-21)
MANUFACTURER	Hoffman Radio Corp., 6200 S. Avalon Blvd., Los Angeles 3, Calif.
TYPE SET	Color Television Receiver
TUBES	Twenty-Eight
POWER SUPPLY	110-120 volts AC-60 Cycle — RATING 3.1 Amp. @ 117 Volts AC
TUNING RANGE	Channels 2 thru 13, Video IF 45.75MC, Sound IF 41.25MC (Intercarrier)

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HOFFMAN MODEL 21M1100A (Ch. 703A-21)

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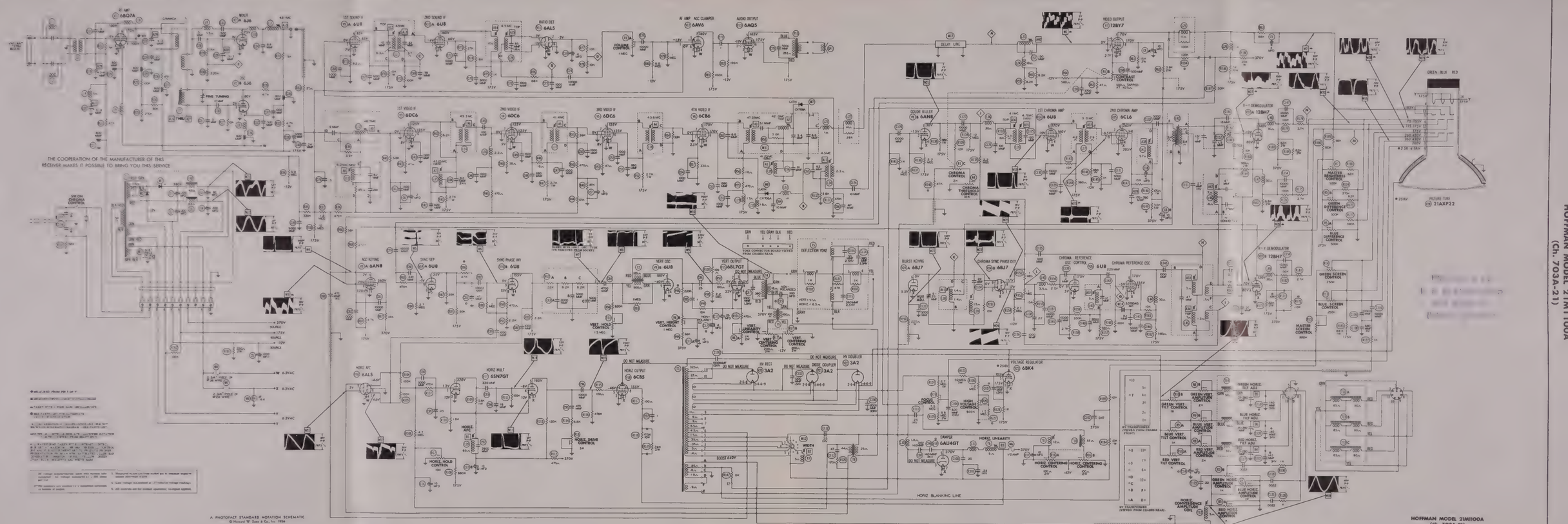
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© Howard W. Sams & Co., Inc. 1956
HORIZ BLANKING LINE
HOFFMAN MODEL 21M1100A (Ch. 703A-21)

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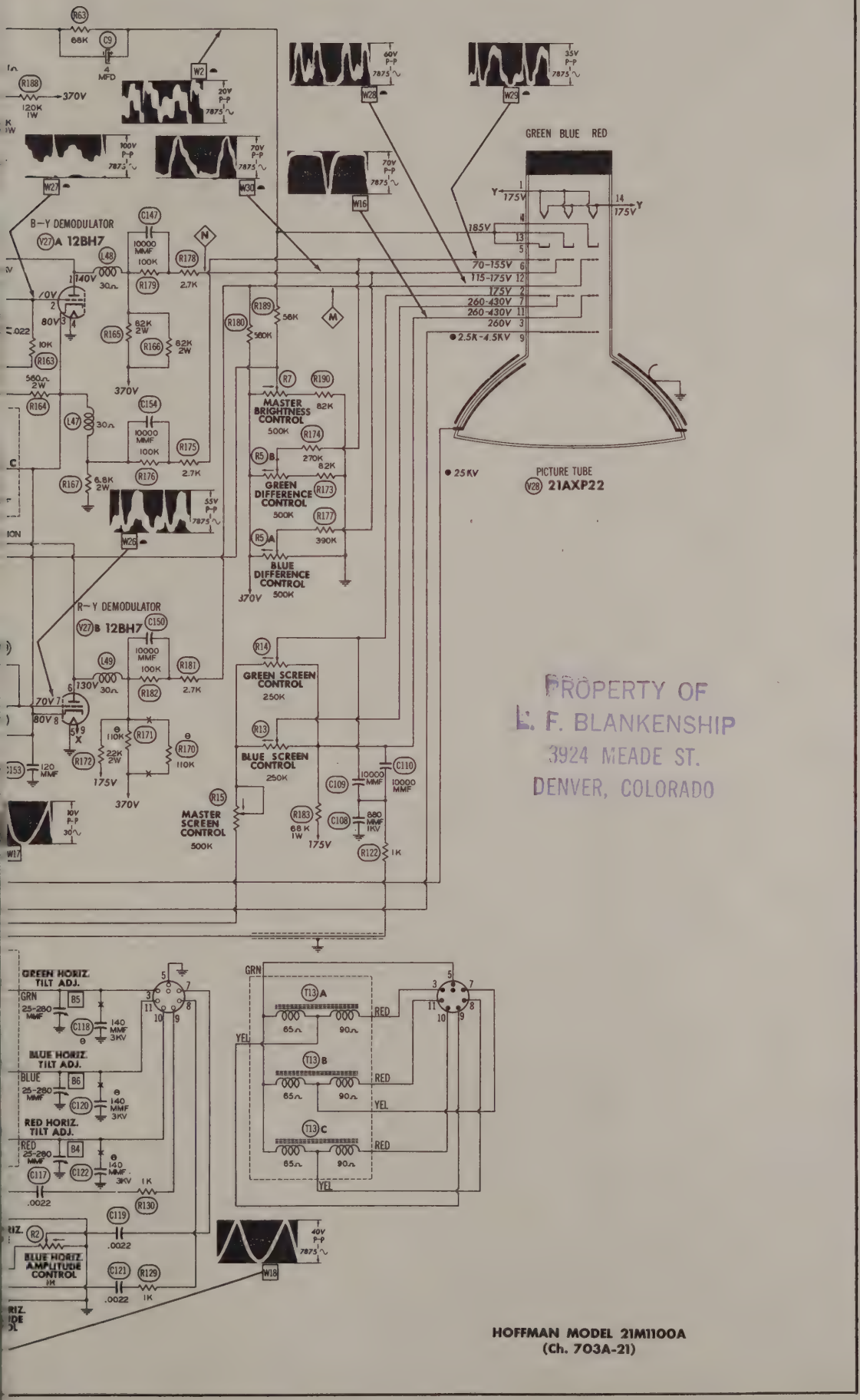

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(Ch. 703A-21)

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(Ch. 703A-21)

C140
C156
C155
C146
C141
C148
C145
C139
C143
C142
C144
C136
C135
C16
C153
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C152
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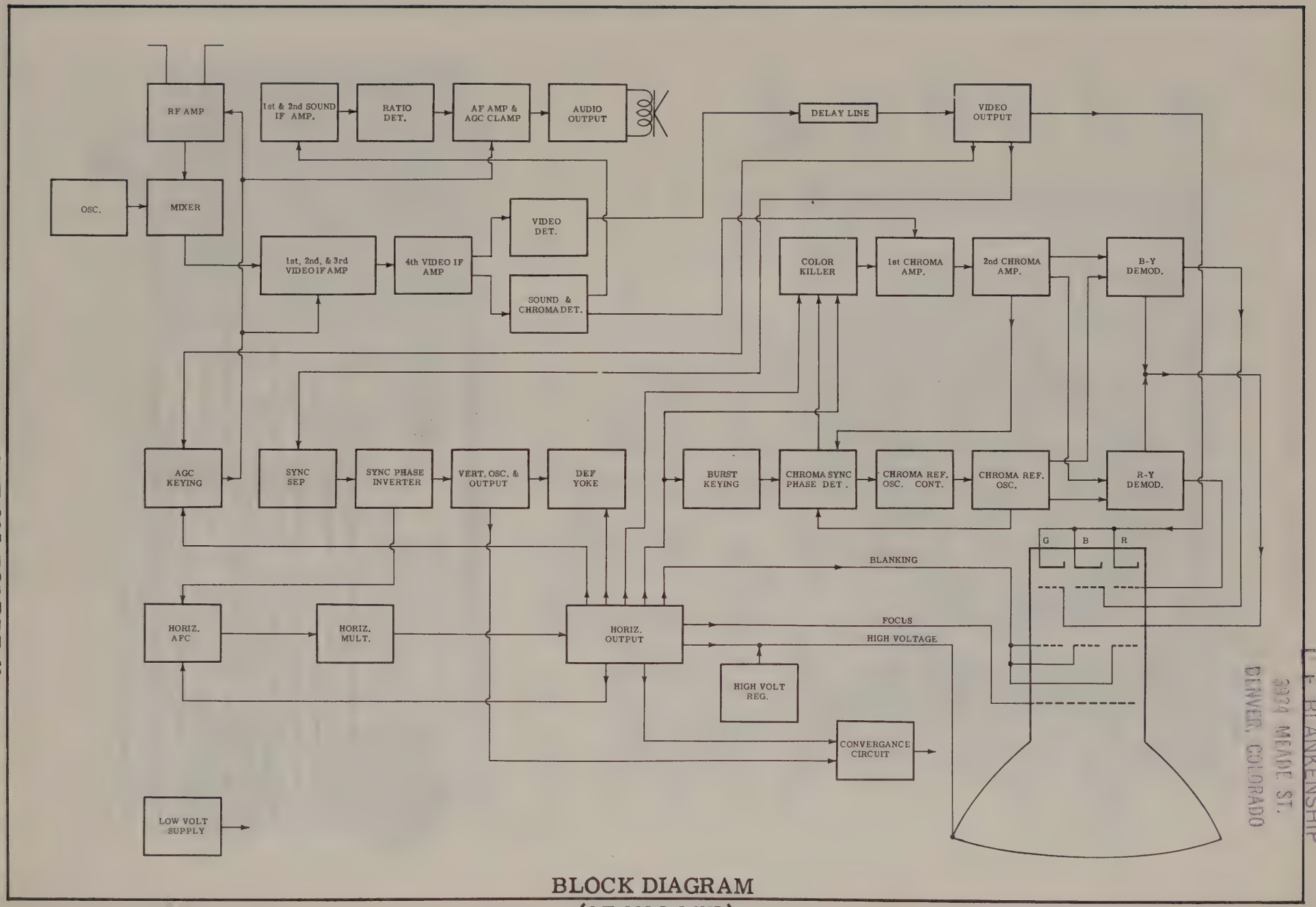

BLOCK DIAGRAM

(Ch. 703A-21)

HOFFMAN MODEL 21M1100A

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RESISTANCE MEASUREMENTS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8	Pin 9
V 1	6BQ7A	INF	1.5Meg	0Ω	.1Ω	0Ω	†550Ω	200KΩ	INF	0Ω
V 2	6J6	†9.5KΩ	†15KΩ	.1Ω	0Ω	235KΩ	10KΩ	0Ω		
V 3	6DC6	100KΩ	47Ω	0Ω	.1Ω	†2.7KΩ	†2.7KΩ	0Ω		
V 4	6DC6	100KΩ	56Ω	.1Ω	0Ω	†2.7KΩ	†2.7KΩ	0Ω		
V 5	6DC6	50KΩ	47Ω	.1Ω	0Ω	†2.7KΩ	†2.7KΩ	0Ω		
V 6	6CB6	.1Ω	330Ω	0Ω	.1Ω	†560Ω	†550Ω	0Ω		
V 7	12BY7	90Ω	4.2KΩ	0Ω	0Ω	0Ω	.1Ω	†5KΩ	‡7.5KΩ	0Ω
V 8	6AN8	†25KΩ	5Meg	0Ω	.1Ω	0Ω	600KΩ	‡10KΩ	†65KΩ	†4.7KΩ
V 9	6U8	‡750KΩ	470KΩ	†10KΩ	.1Ω	0Ω	†10KΩ	82Ω	0Ω	1.5Meg
V 10	6U8	†3.3KΩ	100KΩ	†15KΩ	.1Ω	0Ω	†1KΩ	0Ω	2.7KΩ	1Meg
V 11	6AL5	0Ω	20KΩ	.1Ω	0Ω	INF	0Ω	INF		
V 12	6AV6	1Meg	0Ω	0Ω	.1Ω	NC	1.2Meg	†100KΩ		
V 13	6AQ5	100KΩ	0Ω	.1Ω	0Ω	†350Ω	†43Ω	100KΩ		
V 14	6U8	†45KΩ	4Meg	†10.6KΩ	.1Ω	0Ω	†600Ω	0Ω	0Ω	2.7Meg
V 15	6BL7GT	2.2Meg	‡400Ω	1KΩ	2.2Meg	‡400Ω	1KΩ	.1Ω	0Ω	
V 16	6AL5	5Meg	5Meg	0Ω	.1Ω	2.5KΩ	0Ω	2.5KΩ		
V 17	6SN7GT	5Meg	‡6.2KΩ	1.6KΩ	100KΩ	‡120KΩ	1.6KΩ	.1Ω	0Ω	
V 18	6CB5	NC	.1Ω	0Ω	NC	470KΩ	NC	0Ω	‡13KΩ	TOP CAP ▲13Ω
V 19	6AU4GT	NC	NC	380KΩ	NC	‡50Ω	NC	.1Ω	0Ω	
V 20	3A2	20Meg	20Meg	INF	20Meg	20Meg	20Meg	INF	20Meg	20Meg
V 21	3A2		PINS	1-8	HAVE	INF	RESISTANCE			INF
V 22	3A2		PINS	1-8	HAVE	INF	RESISTANCE			INF
V 23	6BK4	†1KΩ	0Ω	NC	NC	1.5Meg	NC	.1Ω	NC	TOP CAP INF
V 24	6BJ7	2Meg	2.8Ω	0Ω	0Ω	.1Ω	2.8Ω	220Ω	3Meg	2.8Ω
V 25	6CL6	0Ω	500Ω	‡19KΩ	.1Ω	0Ω	‡4KΩ	0Ω	‡19KΩ	500Ω
V 26	6U8	†600Ω	100KΩ	†10.6KΩ	.1Ω	0Ω	†600Ω	0Ω	2.7KΩ	3Meg
V 27	12BH7	‡42KΩ	17KΩ	6.8KΩ	0Ω	0Ω	†20KΩ	17KΩ	6.8KΩ	.1Ω
V 28	21AXP22	†100KΩ	‡100KΩ	†68KΩ	‡60KΩ	‡60KΩ	†80KΩ	▲160-300KΩ	NC	15Meg
		PIN 10 NC	PIN 11 ▲160-300KΩ	PIN 12 ‡100KΩ	PIN 13 ‡60KΩ	PIN 14 †100KΩ				

TOP CAP ▲38Ω
TOP CAP 20Meg
TOP CAP INF

†MEASURED FROM JUNCTION OF C1 & C2.
‡MEASURED FROM OUTPUT OF M1.
▲MEASURED FROM PIN 3 OF V19.
NC-NO CONNECTION.

DISASSEMBLY INSTRUCTIONS

MAIN CHASSIS REMOVAL

1. Remove 7 push-on type control knobs from front panel of cabinet.
2. Remove 9 wood screws and 1 metal screw. Remove rear cover.
3. Remove 2 wing nuts holding side door (accessible to chassis bottom).
4. Disconnect picture tube socket, speaker leads, H. V. lead and power cable (loosen 10 screws on terminal board).
5. Remove 4 chassis bolts (accessible inside side door). Remove chassis.
6. Remove 4 wood screws. Remove speaker.

NOTE: For servicing it may not be necessary to remove the chassis. Remove rear cover and 2 wing nuts for side door to open the bottom of the chassis accessible thru this door.

POWER CHASSIS REMOVAL

1. Remove 9 wood screws and 1 metal screw. Remove rear cover.
2. Remove power cable from main chassis (loosen 10 screws on terminal board).
3. Remove 4 chassis bolts. Remove power chassis.

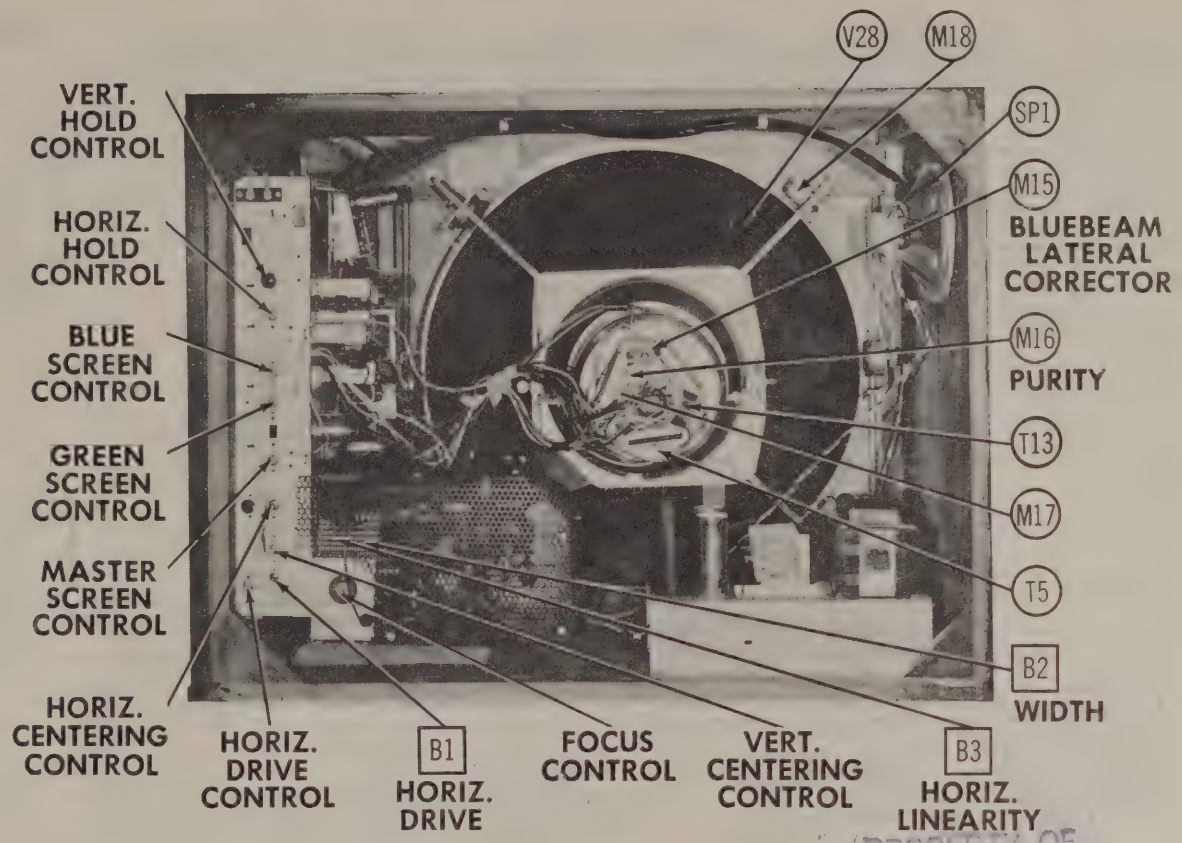
PICTURE TUBE REMOVAL

1. Remove main chassis and power chassis from cabinet.
2. Remove blue beam positioning magnet, centering ring and convergence coils.
3. Lay cabinet face down on a soft surface.
4. Remove 4 hex nuts holding yoke assembly.
5. Loosen strap bolt . Remove H. V. shield.
6. Remove picture tube.

NOTE: Use extreme caution when removing picture tube.

PICTURE TUBE SAFETY GLASS CLEANING

To clean safety glass, remove 3 wood screws holding metal strip at the top edge of safety glass. Remove metal strip and safety glass. Use extreme caution when removing safety glass.



CABINET-REAR VIEW

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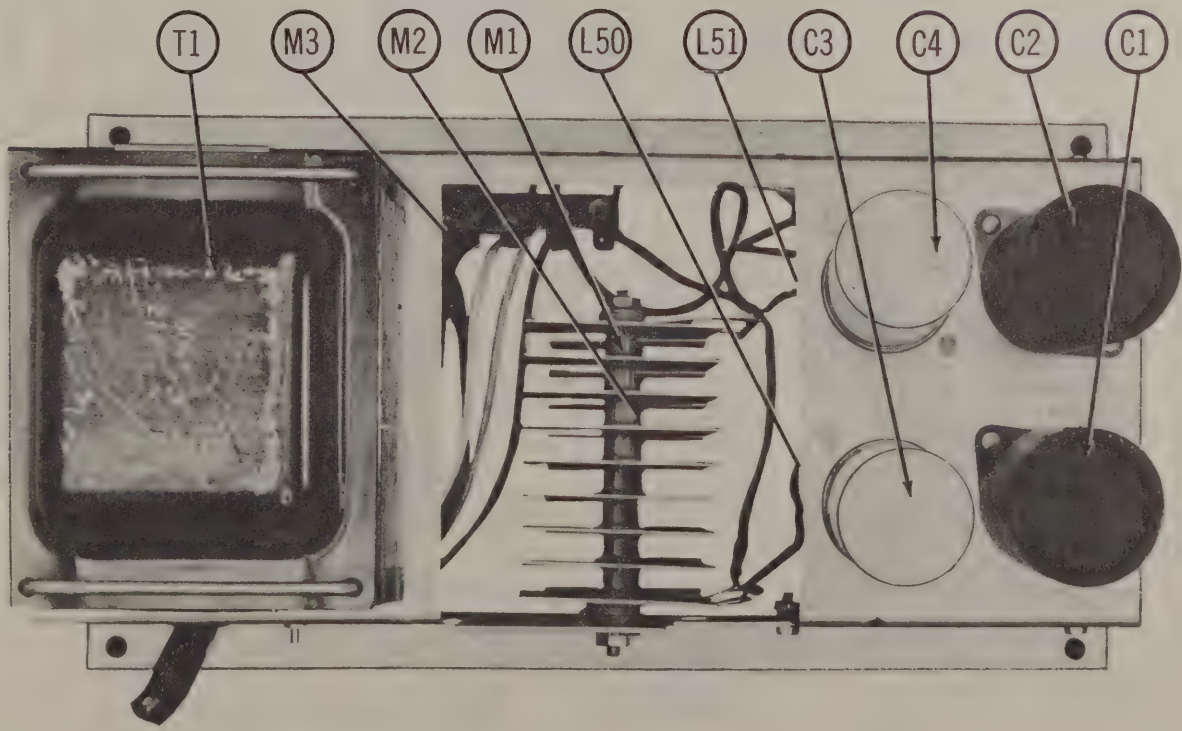


POWER SUPPLY CHASSIS

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

The high voltage shock hazard should be eliminated. This may be done by disconnecting pin 3 of horizontal output tube (V18) from chassis and inserting a 200Ω/10Watt resistor from pin 3 of V18 to chassis. Then remove the horizontal multivibrator tube (V17) from its socket.

VIDEO IF ALIGNMENT

Connect the negative lead of a 3 volt battery to the negative end of C6. Connect the positive lead to chassis. Use only enough signal generator output to provide useable reading on VTVM. Remove the converter tube (V2) from its socket and replace with a 6J6 which has pin 1 removed. This will disable the local oscillator and reduce the possibility of erroneous indications. An alternate method of disabling the local oscillator is to place a piece of transparent cellulose tape on the first two contacts (front of drum assembly) of any channel and then switch the tuner to the insulated strip.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	CHANNEL	CONNECT VTVM	ADJUST	REMARKS
1.	Direct	High side to an ungrounded tube shield floating over dummy converter tube (V2). Low side to chassis.	41.25MC (Unmod.)	Any	DC probe thru 10KΩ to point (A). Common to chassis.	A1	Adjust for MINIMUM deflection.
2.	"	"	42.0MC	"	"	A2	Attenuate signal generator output to maintain 1 volt at VTVM. Adjust for maximum deflection.
3.	"	"	47.25MC	"	"	A3	Adjust for maximum deflection. Repeat steps 1 thru 3 until no change is noted.
4.	"	"	43.6MC	"	"	A4	Attenuate signal generator output to maintain 1 volt at VTVM. Adjust for maximum deflection.
5.	"	"	41.4MC	"	"	A5	"
6.	"	"	45.3MC	"	"	A6	"
7.	"	"	47.25MC	"	"	A7	Adjust for MINIMUM deflection.
8.	"	"	41.25MC	"	"	A8	"
9.	"	"	46.5MC	"	"	A9	Attenuate signal generator output to maintain 1 volt at VTVM. Adjust for maximum deflection.
10.	"	"	43.1MC	"	"	A10	"

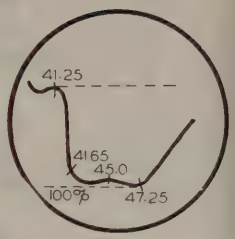


FIG. 1

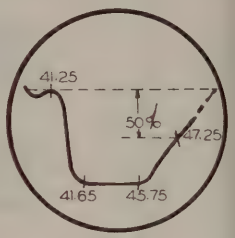


FIG. 3

OVERALL VIDEO IF RESPONSE CHECK

Connect bias as under "Video IF Alignment". In steps 12 thru 14 adjust for -4 volts bias. If necessary, remove bias to observe trap markers. If sweep generator has no build in marker, couple a separate marker generator loosely to sweep generator output. Attenuate sweep generator output to provide not more than 6 volts peak to peak on scope. Connect a 68Ω carbon resistor across sweep generator output. Connect the synchronized sweep voltage from the sweep generator to the horizontal input of the oscilloscope for horizontal deflection.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
11.	.0015MFD	High side thru .0015MFD capacitor to pin 5 (plate) of 3rd Video IF amplifier tube (V5). Low side to chassis.	44.0MC (10MC Swp.)	41.25MC 41.65MC 45.0MC 47.25MC	Any	Vert. Amp. thru 10KΩ to point (A). Low side to chassis.	A1, A2, A3	Adjust A2 and A3 for response curve similar to Fig. 1. If necessary slightly retouch A1 to place 41.25MC trap marker in trap notch as in Fig. 1.
12.	"	High side to pin 1 (grid) of 1st Video IF Amplifier tube (V3). Low side to chassis near V3.	"	41.25MC 41.65MC 45.0MC 45.75MC 47.25MC	"	"	A4, A5, A6	Increase bias to -4 volts at ungrounded side of C6 and chassis. Attenuate sweep generator output to produce 6 volts peak to peak on scope. Adjust for response curve similar to Fig. 2. A4 affects tilt, A5 affects bandwidth on low frequency end, A6 affects high frequency side and position of 45.75MC marker.
13.	Direct	High side to an ungrounded tube shield floating over dummy converter tube (V2). Low side to chassis.	"	41.25MC 41.65MC 45.75MC 47.25MC	"	Vert. Amp. thru detector (Fig. 5) to pin 5 (plate) of 1st Video IF amplifier tube (V3). Low side to chassis.	A8, A9, A10	Connect a short clip lead across the 47.25MC trap coil (L15). Check for response curve similar to Fig. 3. If necessary adjust A9 and A10 for desired response. Slightly retouch A8 to place 41.25MC marker in trap notch as in Fig. 3. Remove short from (L15).
14.	"	"	"	41.25MC 41.65MC 45.0MC 45.75MC 47.25MC	"	Vert. Amp. thru 10KΩ to point (A). Low side to chassis.		Check for overall IF response curve similar to Fig. 4. If necessary slightly retouch A4, A5, and A6 for desired response. Check position of 41.25MC and 47.25MC traps. If necessary increase generator output and slightly retouch A1 (41.25MC) and A7 (47.25MC) to place markers in trap notches as in Fig. 4. Replace original 6J6 in its socket.

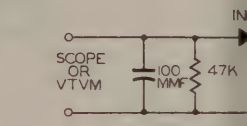


FIG. 5

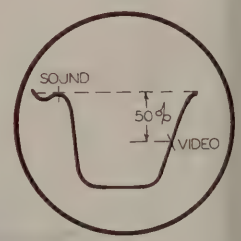


FIG. 6

SOUND IF ALIGNMENT USING AM SIGNAL GENERATOR AND VTVM

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	CHANNEL	CONNECT VTVM	ADJUST	REMARKS
15.	.005MFD	High side to point (B). Low side to chassis.	4.5MC (Unmod.)	Any non-interfering channel	DC probe to point (C). Common to chassis.	A11, A12, A13	Adjust for maximum deflection.
16.	"	"			DC probe to point (D). Common to chassis.	A14	"
17.	"	"	"	"	DC probe to point (E). Common to chassis.	A15	Adjust for zero reading. A positive and negative reading will be obtained on either side of the correct setting. Repeat steps 16 and 17.

SOUND IF ALIGNMENT USING TV SIGNAL AND VTVM

Disconnect test equipment. Connect antenna to antenna terminals. Tune in a TV station and adjust for best picture.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	CHANNEL	CONNECT VTVM	ADJUST	REMARKS
15.	Not used	Not used. Tune in a TV signal.	Not used	Any station available	DC probe to point (C). Common to chassis.	A11, A12, A13	Adjust for maximum deflection.
16.	"	"	"	"	DC probe to point (D). Common to chassis.	A14	"
17.	"	"	"	"	DC probe to point (E). Common to chassis.	A15	Adjust for zero reading. A positive and negative reading will be obtained on either side of the correct setting. Repeat steps 16 and 17. Remove VTVM and adjust A15 for best program sound and MINIMUM buzz.

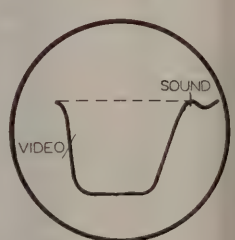


FIG. 8

ALIGNMENT INSTRUCTIONS

ALIGNMENT INSTRUCTIONS--READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

The high voltage shock hazard should be eliminated. This may be done by disconnecting pin 3 of horizontal output tube (V18) from chassis and inserting a 200Ω/10Watt resistor from pin 3 of V18 to chassis. Then remove the horizontal multivibrator tube (V17) from its socket.

VIDEO IF ALIGNMENT

Connect the negative lead of a 3 volt battery to the negative end of C8. Connect the positive lead to chassis. Use only enough signal generator output to provide useable reading on VTVM. Remove the converter tube (V2) from its socket and replace with a 6J6 which has pin 1 removed. This will disable the local oscillator and reduce the possibility of erroneous indications. An alternate method of disabling the local oscillator is to place a piece of transparent cellulose tape on the first two contacts (front of drum assembly) of any channel and then switch the tuner to the insulated strip.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	CHANNEL	CONNECT VTVM	ADJUST	REMARKS
1.	Direct	High side to an ungrounded tube shield floating over dummy converter tube (V2). Low side to chassis	41.25MC (Unmod.)	Any	DC probe thru 10KΩ to point Ⓧ. Common to chassis.	A1	Adjust for MINIMUM deflection.
2.	"	"	42.0MC	"	"	A2	Attenuate signal generator output to maintain 1 volt at VTVM. Adjust for maximum deflection.
3.			47.25MC	"	"	A3	Adjust for maximum deflection. Repeat steps 1 thru 3 until no change is noted.
4.			43.6MC	"	"	A4	Attenuate signal generator output to maintain 1 volt at VTVM. Adjust for maximum deflection.
5.	"	"	41.4MC	"	"	A5	"
6.			45.5MC	"	"	A6	"
7.			41.25MC	"	"	A7	Adjust for MINIMUM deflection.
8.			41.25MC	"	"	A8	"
9.			46.5MC	"	"	A9	Attenuate signal generator output to maintain 1 volt at VTVM. Adjust for maximum deflection.
10.	"	"	43.1MC	"	"	A10	"

OVERALL VIDEO IF RESPONSE CHECK

Connect bias as under "Video IF Alignment". In steps 12 thru 14 adjust for -4 volts bias. If necessary, remove bias to observe trap markers. If sweep generator has no build in marker, couple a separate marker generator loosely to sweep generator output. Attenuate sweep generator output to provide not more than 5 volts peak to peak on scope. Connect a 68Ω carbon resistor across sweep generator output. Connect the synchronized sweep voltage from the sweep generator to the horizontal input of the oscilloscope for horizontal deflection.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
11.	.005MFD	High side thru . 005MFD capacitor to pin 5 (plate) of 3rd Video IF amplifier tube (V5). Low side to chassis.	44.0MC (10MC Swp)	41.25MC 41.85MC 45.0MC 47.25MC	Any	Vert. Amp. thru 10KΩ to point Ⓧ. Low side to chassis	A1, A2, A3	Adjust A2 and A3 for response curve similar to Fig. 1. If necessary slightly retouch A1 to place 41.25MC trap marker in trap notch as in Fig. 1.
12.	"	High side to pin 1 (grid) of 1st Video IF Amplifier tube (V3). Low side to chassis near V3.	"	41.25MC 41.85MC 45.0MC 45.75MC 47.25MC	"	"	A4, A5, A6	Increase bias to -4 volts at ungrounded side of C8 and chassis. Attenuate sweep generator output to produce 5 volts peak to peak on scope. Adjust for response curve similar to Fig. 2. A4 affects 111, A5 affects bandwidth on low frequency end, A6 affects high frequency side and position of 45.75MC marker.
13.	Direct	High side to an ungrounded tube shield floating over dummy converter tube (V2). Low side to chassis.	"	41.25MC 41.85MC 45.75MC 47.25MC	"	Vert. Amp. thru detector (Fig. 5) to pin 5 (plate) of 1st Video IF amplifier tube (V3). Low side to chassis.	A8, A9, A10	Connect a short clip lead across the 4125MC trap coil (L10). Check for response curve similar to Fig. 3. If necessary adjust A9 and A10 for desired response. Slightly retouch A8 to place 41.25MC marker in trap notch as in Fig. 3. Remove short from (L10).
14.	"	"	"	41.25MC 41.85MC 45.0MC 45.75MC 47.25MC	"	Vert. Amp. thru 10KΩ to point Ⓧ. Low side to chassis.		Check for overall IF response curve similar to Fig. 4. If necessary slightly retouch A4, A5, and A6 for desired response. Check position of 41.25MC and 47.25MC traps. If necessary increase generator output and slightly retouch A1 (41.25MC) and A7 (47.25MC) to place markers in trap notches as in Fig. 4. Replace original 6J6 in its socket.

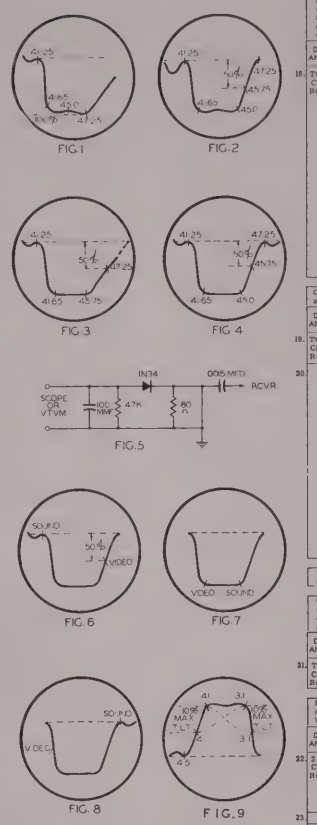
SOUND IF ALIGNMENT USING AM. SIGNAL GENERATOR AND VTVM

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	CHANNEL	CONNECT VTVM	ADJUST	REMARKS
15.	.005MFD	High side to point Ⓧ. Low side to chassis.	4.5MC (Unmod.)	Any non-interfering channel	DC probe to point Ⓧ. Common to chassis.	A11, A12, A13	Adjust for maximum deflection.
16.	"	"			DC probe to point Ⓧ. Common to chassis.	A14	"
17.	"	"	"	"	DC probe to point Ⓧ. Common to chassis.	A15	Adjust for zero reading. A positive and negative reading will be obtained on either side of the correct setting. Repeat steps 16 and 17.

SOUND IF ALIGNMENT USING TV SIGNAL AND VTVM

Disconnect test equipment. Connect antenna to antenna terminals. Tune in a TV station and adjust for best picture.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	CHANNEL	CONNECT VTVM	ADJUST	REMARKS
15.	Not used	Not used. Tune in a TV signal.	Not used	Any station available	DC probe to point Ⓧ. Common to chassis.	A11, A12, A13	Adjust for maximum deflection.
16.	"	"	"	"	DC probe to point Ⓧ. Common to chassis.	A14	"
17.	"	"	"	"	DC probe to point Ⓧ. Common to chassis.	A15	Adjust for zero reading. A positive and negative reading will be obtained on either side of the correct setting. Repeat steps 16 and 17. Remove VTVM and adjust A15 for best program sound and MINIMUM buzz.



OSCILLATOR ALIGNMENT

Remove the dummy converter tube and replace the original 6J6 in its socket or remove cellulose tape from tuner strip. The channel oscillator adjustments screws are reached through a hole just to the right of the channel switch shaft. The correct adjustment screw is accessible thru this hole as the channel switch is turned to each channel. Use only enough sweep generator output to provide usable pattern on scope. Leave bias connected as under "Overall Video IF Response Check" and connect a jumper from grounded side of C8 to tuner AGC terminal. Connect the synchronized sweep voltage from the sweep generator to the horizontal input of the oscilloscope for horizontal deflection. The sweep generator output lead should be terminated with its characteristic impedance, usually 50 ohms. Set the fine tuning control in the mid-position of its range.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
18.	Two 130Ω Carbon Resistors	Across antenna terminals with 130Ω in each lead.	213MC (10MC Swp)	211.25MC 215.75MC	13	Vert. Amp. thru 10KΩ to point Ⓧ. Low side to chassis.	A18	Adjust to place sound marker as in Fig. 8. Video marker should be at 80%.
			207MC (10MC Swp)	205.25MC 209.75MC	12		A17	
			201MC (10MC Swp)	199.25MC 203.75MC	11		A18	
			195MC (10MC Swp)	193.25MC 197.75MC	10		A19	
			189MC (10MC Swp)	187.25MC 191.75MC	9		A20	
			183MC (10MC Swp)	181.25MC 185.75MC	8		A21	
			177MC (10MC Swp)	175.25MC 179.75MC	7		A22	
			85MC (10MC Swp)	83.25MC 87.75MC	6		A23	
			79MC (10MC Swp)	77.25MC 81.75MC	5		A24	
			69MC (10MC Swp)	67.25MC 71.75MC	4		A25	
			63MC (10MC Swp)	61.25MC 65.75MC	3		A26	
			57MC (10MC Swp)	55.25MC 59.75MC	2		A27	

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RF AND MIXER ALIGNMENT

Connect the synchronized sweep voltage from the sweep generator to the horizontal input of the oscilloscope for horizontal deflection. The sweep generator output lead should be terminated with its characteristic impedance, usually 50 ohms.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
19.	Two 130Ω Carbon Resistors	Across antenna terminals with 130Ω in each lead.	207MC (10MC Swp)	205.25MC 209.75MC	12	Vert. Amp. thru 10KΩ to point Ⓧ. Low side to chassis.	A29, A28, A30	Adjust for response similar to Fig. 7 with markers above 80%.
20.	"	"	213MC (10MC Swp)	211.25MC 215.75MC	13	"		If markers fall below 70% on any channel make compromise adjustment of A28, A29 and A30 with channel switch set to that channel, then check all other channels to see that they have not been seriously affected.
			201MC (10MC Swp)	199.25MC 203.75MC	11			
			195MC (10MC Swp)	193.25MC 197.75MC	10			
			189MC (10MC Swp)	187.25MC 191.75MC	9			
			183MC (10MC Swp)	181.25MC 185.75MC	8			
			177MC (10MC Swp)	175.25MC 179.75MC	7			
			85MC (10MC Swp)	83.25MC 87.75MC	6			
			79MC (10MC Swp)	77.25MC 81.75MC	5			
			69MC (10MC Swp)	67.25MC 71.75MC	4			
			63MC (10MC Swp)	61.25MC 65.75MC	3			
			57MC (10MC Swp)	55.25MC 59.75MC	2			

44MC IF TRAP ADJUSTMENT

The IF trap (Adjustment A31) is for the purpose of eliminating any interference in the IF range. Tune to the channel on which interference is noted and adjust A31 for minimum interference on the picture tube screen. Check to see that reception on channel 2 has not been affected.

OVERALL VIDEO IF AND TUNER RESPONSE CHECK

Connect bias as under "Overall Video IF response check" and connect a jumper from ungrounded side of C8 to tuner AGC terminal. Use only enough sweep generator output to provide usuable pattern on scope. Connect a 68Ω carbon resistor across sweep generator output. Connect the synchronized sweep voltage from the sweep generator to the horizontal input of the oscilloscope for horizontal deflection. The sweep generator output lead should be terminated with its characteristic impedance, usually 50 ohms.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
21.	Two 130Ω Carbon Resistors	Across antenna terminals with 130Ω in each lead.	207MC (10MC Swp)	205.25MC 209.75MC	12	Vert. Amp. thru 10KΩ to point Ⓧ. Low side to chassis.		Check for response curve similar to Fig. 8. If necessary SLIGHTLY retouch A4, A5 and A6 for desired response.

CHROMA BANDPASS AMPLIFIER ALIGNMENT

Remove the chroma reference oscillator tube (6U8/V26) from its socket. Connect a short clip lead from pin 2 of color killer tube (V8B) to chassis. Connect the negative lead of a 5 volt bias supply to point Ⓨ. Positive lead to chassis. Replace V17 in its socket. Remove 220Ω/10 Watt resistor from pin 3 of V18 and reconnect pin 3 of V18 to chassis.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
22.	2.9KΩ Carbon Resistors	High side to point Ⓧ. Low side to chassis.	Not used	4.5MC (Unmod)	Any	Use VTVM. DC probe to pin 1 (cathode) of color phase detector tube (V24B). Common to chassis.	A35, A11	Attenuate signal generator output to maintain not more than 5 volts on VTVM. Adjust for MINIMUM deflection. Retouch A11 for MINIMUM.
23.	"	"	"	4.1MC	"	"	A36	Adjust for maximum deflection.
24.	"	"	"	3.9MC	"	"	A37	"
25.	Connect a .05MFD capacitor from pin 2 of 1st. chroma amplifier (V14B) to chassis. Replace V26 in its socket. Connect vertical amplifier of scope to point Ⓧ. Low side to chassis. Adjust A38 for minimum amplitude of hash on scope, then adjust the 2nd. chroma amplifier screen bypass trimmer (A39) for MINIMUM hash. Repeat adjustments of A38 and A39 until a position of A38 is found with minimum hash. Remove .05MFD from pin 2 of V14B.							
26.	3.9KΩ Carbon Resistor	High side to point Ⓧ. Low side to chassis.	3MC (10MC Swp)	3.1MC 4.1MC 4.3MC	Any	Vert. Amp. thru detector (Fig. 5) to pin 6 of R-Y demodulator (V37B). Low side to chassis.		Couple a marker generator loosely to pin 2 of V14B (1st. chroma amp. tube). Remove V26 from its socket. Check for response curve similar to Fig. 9. If necessary, SLIGHTLY retouch A38 and A37 for desired response.

ALIGNMENT INSTRUCTIONS (cont)

3.58MC TRAP ALIGNMENT

Set brightness and contrast controls fully clockwise.

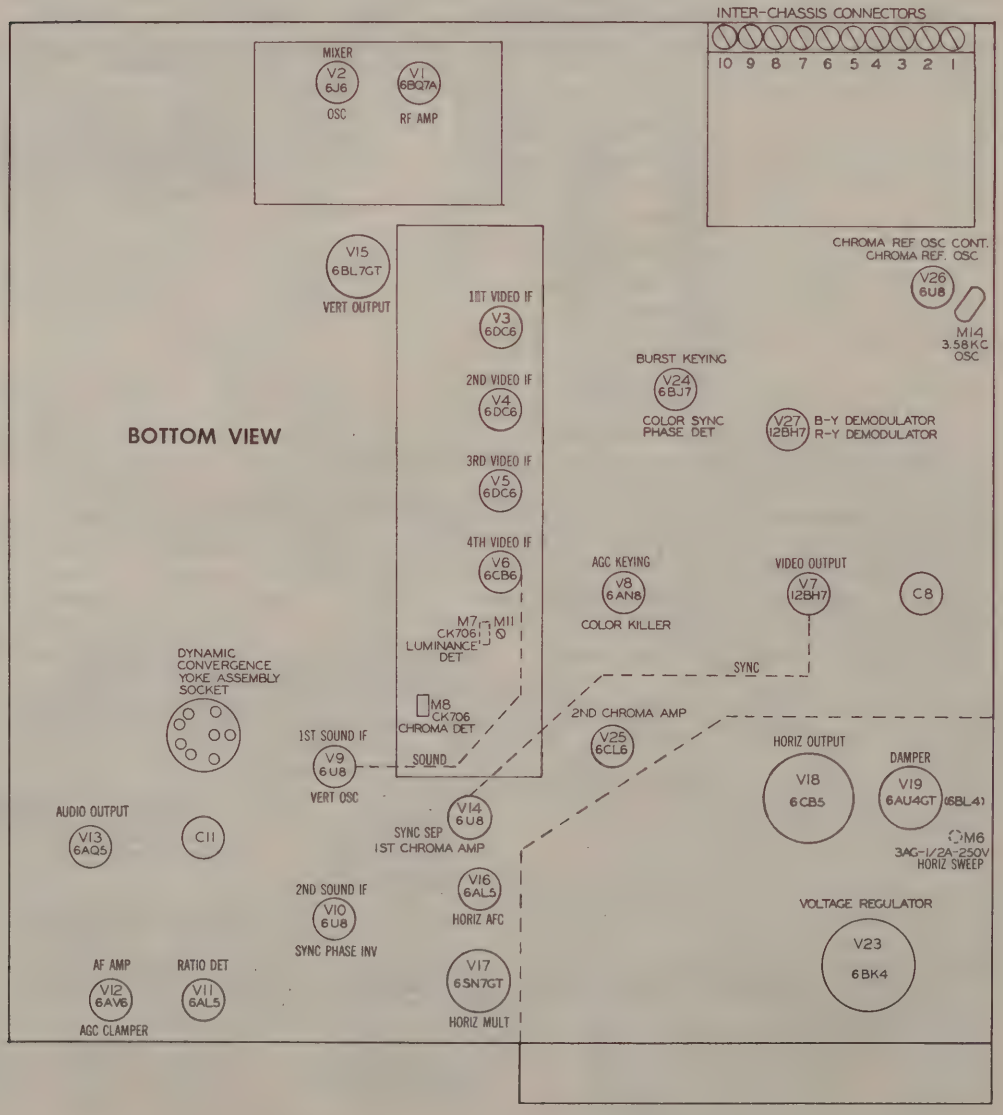
	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
27.	.005MFD	High side to point (A). Low side to chassis.	Not used	3.58MC (400~Mod)	Any	Vert. Amp. thru detector (Fig. 5) to pin 5 (cathode) of picture tube. Low side to chassis.	A40	Adjust for MINIMUM 400~ modulation on scope. Remove 200Ω, 2 watt resistor from pin 3 of V18 to chassis. Connect pin 3 of V18 to chassis. Replace V17 in its socket.

CHROMA REFERENCE OSCILLATOR ALIGNMENT

① Connect the DC probe of a VTVM to point (G). Common to chassis. Adjust the reference oscillator plate coil slug (A32) for maximum negative reading on VTVM. Remove VTVM.
② Connect the vertical amplifier of scope to point (H). Low side to chassis. Adjust the bottom slug of the chroma reference oscillator coil (A33) for maximum indication on scope. Turn the top slug of the chroma reference oscillator coil (A34) two turns in either direction. Readjust A33 again for maximum indication on scope. Continue adjusting A33 and A34 until a position of A34 is found that gives maximum indications on scope. Check peak to peak voltage on scope at point (H).
③ Connect the vertical amplifier of scope to point (I). Low side to chassis. Check the peak to peak voltage at point (I). It should be the same as at point (H). If necessary repeat step 2. Remove scope.
④ Connect a color bar signal generator across antenna terminals. Connect a short clip lead from point (L) to chassis. Check color oscillator sync. If necessary adjust A32 until color bias appear to move slowly from one side of the screen to the other. Remove short from point (L) and chassis. Color bars should now be in sync.

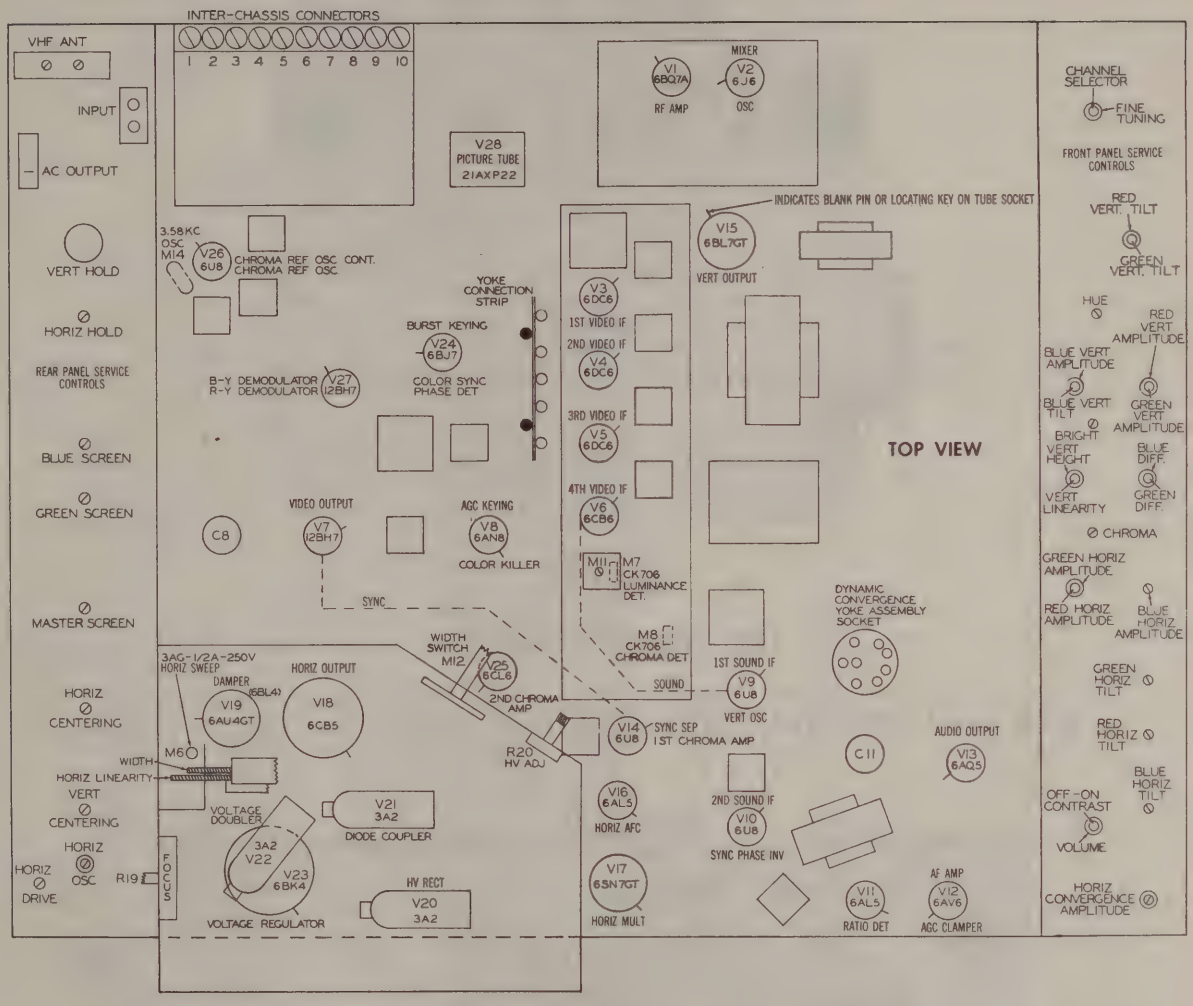
BURST COIL ADJUSTMENT

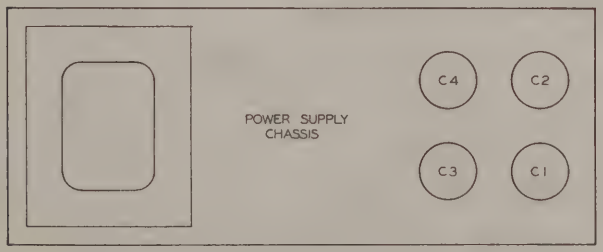
Connected a color bar generator across antenna terminals. Set the hue control trimmer at one half mesh position. Turn the contrast control fully counterclockwise. Turn the chroma control one half turn from its counterclockwise position. Connect DC probe of VTVM to pin 1 of color phase detector (V24). Common to chassis. Adjust the burst coil slug (A41) for maximum deflection on VTVM.


INTER-CHASSIS CONNECTORS
10 9 8 7 6 5 4 3 2 1
MIXER
V2 6J6 OSC
V1 6BQ7A RF AMP
V15 6BL7GT VERT OUTPUT
1ST VIDEO IF V3 6DC6
2ND VIDEO IF V4 6DC6
3RD VIDEO IF V5 6DC6
4TH VIDEO IF V6 6CB6
M7 M11 CK706 LUMINANCE DET
M8 CK706 CHROMA DET
BOTTOM VIEW
DYNAMIC CONVERGENCE YOKE ASSEMBLY SOCKET
1ST SOUND IF V9 6U8 VERT OSC
AUDIO OUTPUT V13 6AQ5
C11
SYNC SEP 1ST CHROMA AMP V14 6U8
2ND SOUND IF V10 6U8 SYNC PHASE INV
V16 6AL5 HORIZ AFC
V17 6SN7GT HORIZ MULT
AF AMP V12 6AV6 AGC CLAMPER
RATIO DET V11 6AL5
CHROMA REF OSC CONT. CHROMA REF. OSC V26 6U8
M14 3.58KC OSC
BURST KEYING V24 6BJ7 COLOR SYNC PHASE DET
V27 12BH7 B-Y DEMODULATOR R-Y DEMODULATOR
AGC KEYING V8 6AN8 COLOR KILLER
VIDEO OUTPUT V7 12BH7
C8
SYNC
2ND CHROMA AMP V25 6CL6
HORIZ OUTPUT V18 6CB5
DAMPER V19 6AU4GT (6BL4)
M6 3AG-1/2A-250V HORIZ SWEEP
VOLTAGE REGULATOR V23 6BK4

TUBE PLACEMENT CHART

TUBE PLACEMENT CHART





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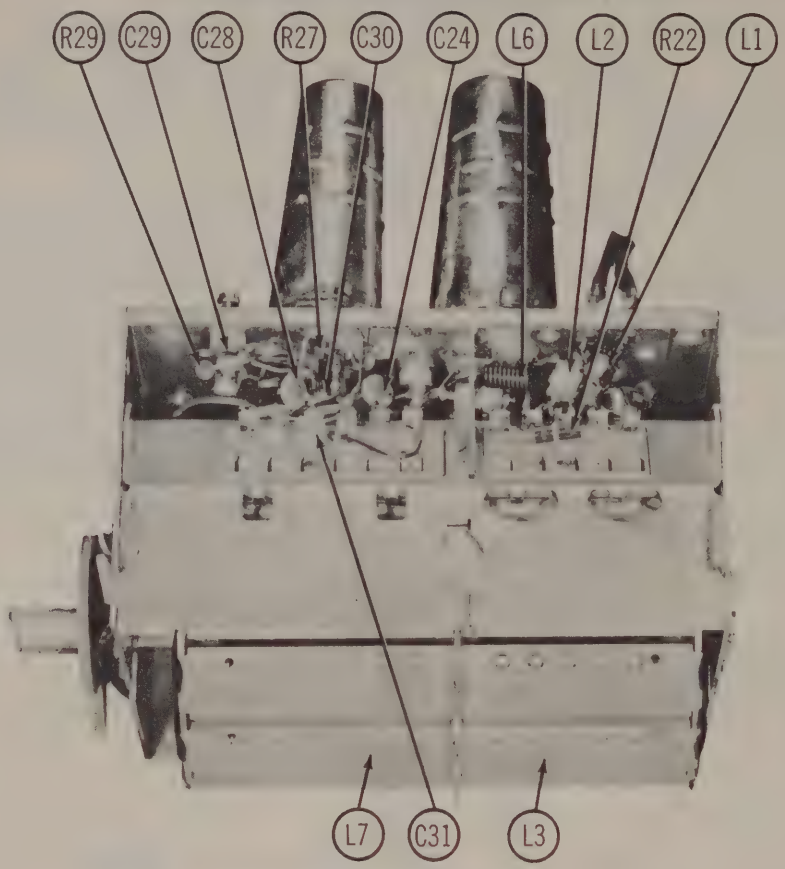
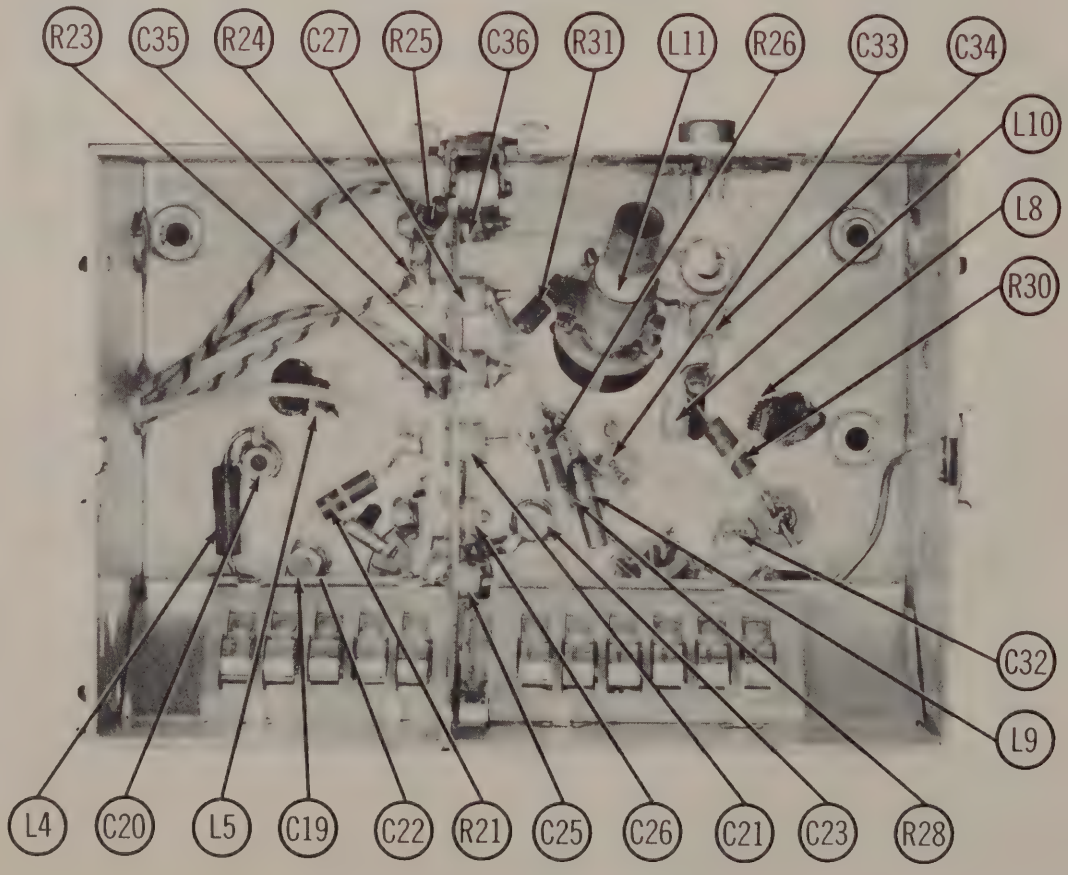
HOFFMAN MODEL 21M1100A
(Ch. 703A-21)



RF TUNER-RIGHT SIDE



RF TUNER-BOTTOM VIEW

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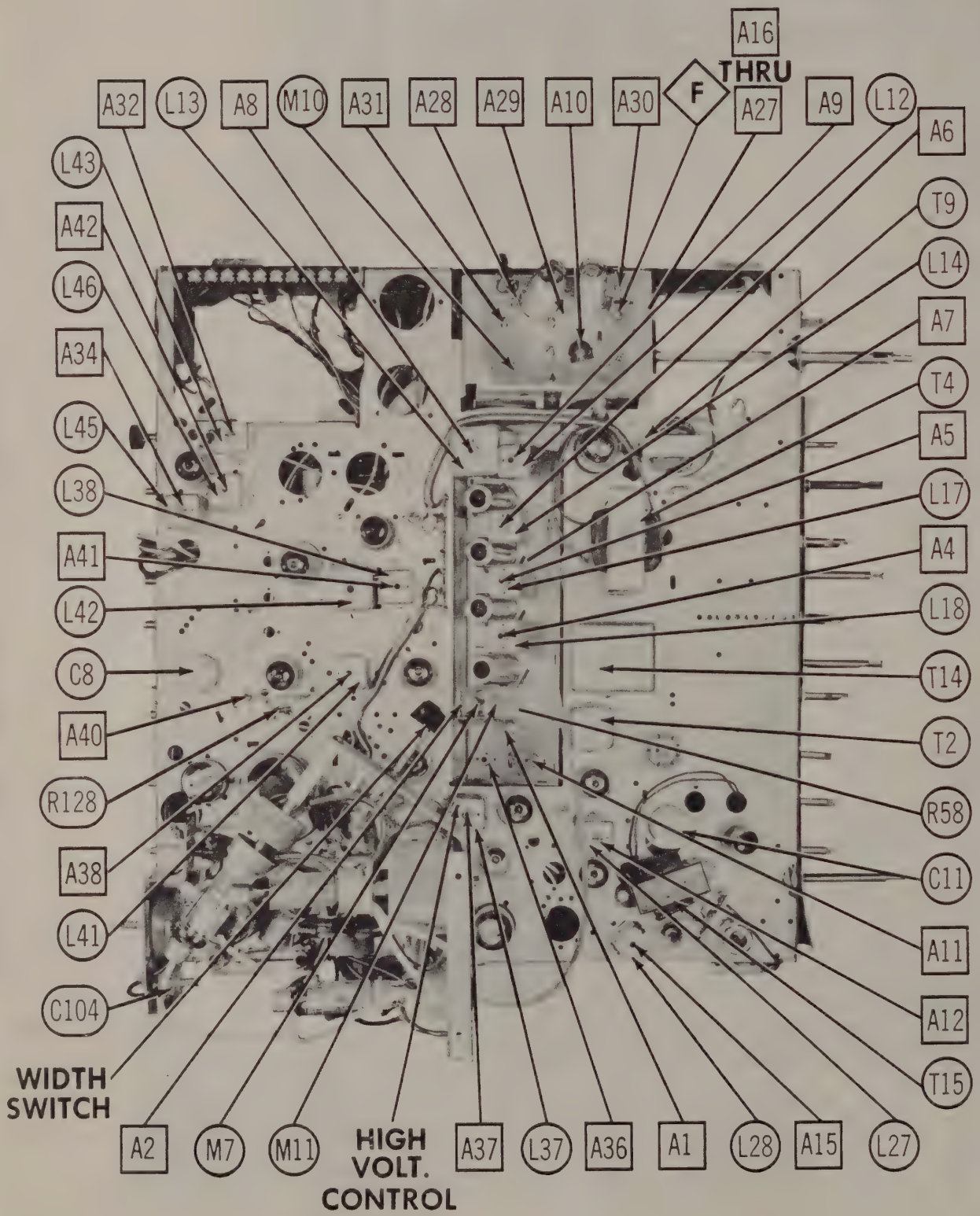
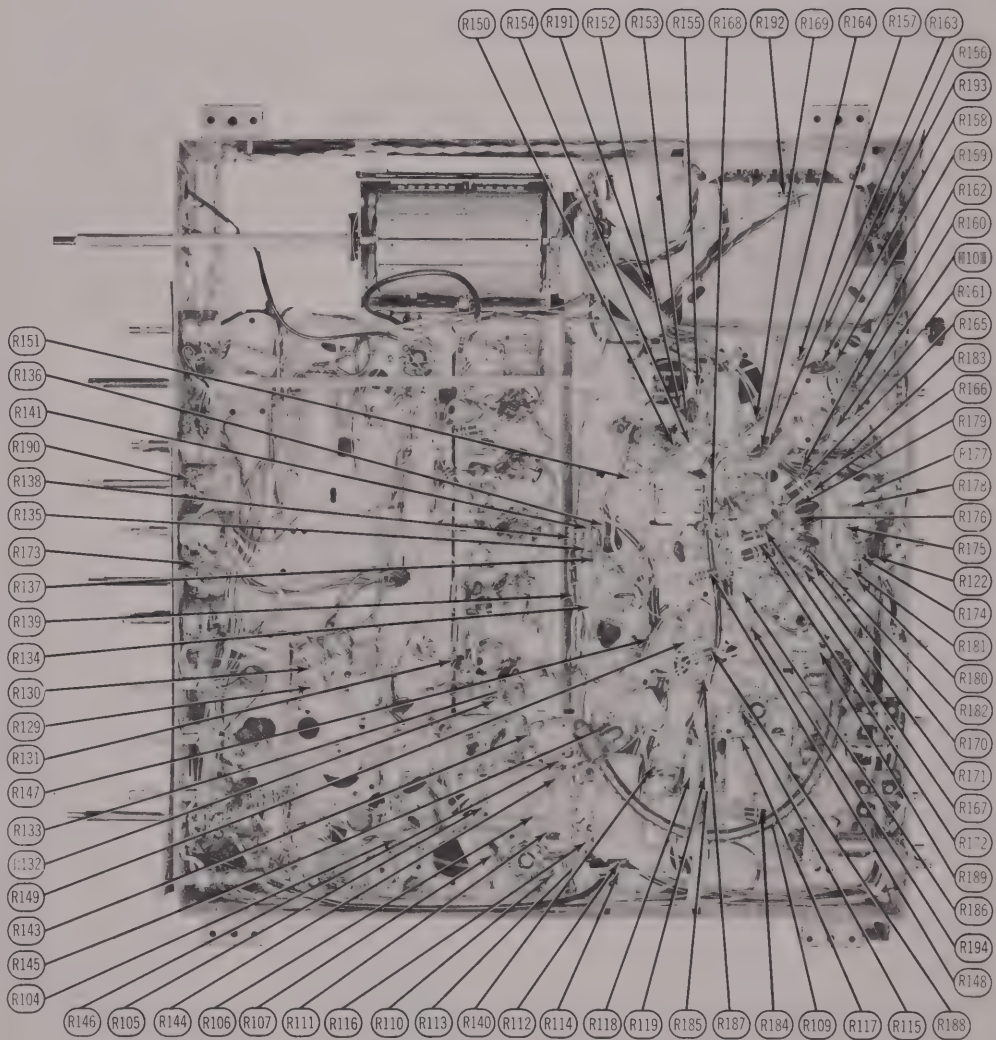
CHASSIS BOTTOM VIEW-RESISTOR IDENTIFICATION (R1-R101)

HOFFMAN MODEL 21M1100A
(Ch. 703A-21)



CHASSIS TOP VIEW



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CHASSIS-BOTTOM VIEW-RESISTOR IDENTIFICATION (R104-R194)

HOFFMAN MODEL 21M1100A
(Ch. 703A-21)

MISCELLANEOUS ADJUSTMENTS

R-Y AND B-Y BALANCE ADJUSTMENT

Connect a color signal generator, providing -R-Y and -B-Y signals across antenna terminals. Connect the vertical amplifier thru a low capacity probe to point ◈. Low side to chassis.

Set the hue control trimmer at one half mesh position. Adjust A41 for zero B-Y signal indication on scope. Move the scope to point ◈. Adjust A42 for zero R-Y signal indication on scope. Move scope back to point ◈ and recheck A41 for zero indication of B-Y signal on scope.

Check all three color signals R-Y, B-Y and G-Y. With the hue control trimmer at one half mesh position the color bias should appear in their proper ratio. (Fig. 10).

HORIZONTAL SWEEP CIRCUIT ADJUSTMENTS

Turn the set on and tune in a TV station, preferably a test pattern.

Turn the horizontal drive control (R18) as far as possible without the presence of vertical white lines or compression near the center of the picture.

Adjust the horizontal centering control (R16) to center picture preferably while viewing a test pattern.

Set the horizontal hold control to its mid-range position.

Adjust the horizontal AFC slug (B1) counterclockwise while switching on and off channel until the picture loses sync. Turn B1 clockwise and note the number of diagonal bars just before the picture pulls into sync. There should be less than two bars if the horizontal section is operating properly. Continue turning B1 clockwise while switching on and off channel, until sync is lost again, then turn B1 counterclockwise and not the point where picture pulls into sync. Turn B1 an additional half turn counter-clockwise. Adjust the horizontal width slug (B2) for a picture slightly wider than necessary to fill the picture mask horizontally.

Adjust the horizontal linearity slug (B3) for a picture that is symmetrical from left to right.

HIGH VOLTAGE ADJUSTMENTS

Connect a 0-1MA milliameter across the cathode regulator resistor (R128). One side of R128 is connected to pin 1 of V23 and the other side to B-. Set the contrast control the brightness control fully counterclockwise. Adjust the high voltage control (R29) for a reading of .7MA on meter. The maximum high voltage rating is 25KV. Remove milliameter.

COLOR PURITY ADJUSTMENT

Set the six magnets on the field equalizing assembly to their maximum counterclockwise positions.

Connect a signal from a dot pattern generator across the antenna terminals. Make certain the horizontal sweep circuit adjustments are correct. Adjust the 3 beam positioning magnets (located on dynamic convergance yoke assembly T13A, B and C) and the blue lateral corrector magnet (M15) (located around neck of tube) for convergance of the three beams (red, green and blue) at the center of the picture tube.

Remove any signal to the receiver and make the blue and green guns inoperative by turning the green and blue difference and the blue and green screen controls fully counterclockwise. Adjust the brightness control for a brighter than normal raster. Loosen the four screws that hold the cradle to allow movement of the yoke. If set has previously been adjusted for purity, a slight adjustment of yoke position should be sufficient. Note position and location of the purity magnet (M16), it consists of two magnetic rings between the blue corrector magnet and the dynamic convergance coils. Adjust to position tabs of one ring opposite the tab of the other ring until minimum strength magnetic field is produced. When correct tabs of the purity device are opposite each other,rotating both rings together should have no effect on the screen. If incorrect, position tabs on magnetic rings to place the tabs adjacent to each other. To check purity at the center of the screen, separate the tabs slightly to produce a weak magnetic field. Rotate the purity magnet to obtain best red purity in center of the screen. Continue adjusting the field strength with position of purity magnet tabs until the red purity is best in center portion of the screen. Move the yoke slightly backward or forward until best red purity is obtained with minimum color contamination of the red field. Tighten yoke. Adjust the six magnets on the field equalizing assembly for the best overall purity over the entire screen. Adjustment of the magnets will have the most effect near the edges of the screen.

DYNAMIC CONVERGENCE ADJUSTMENTS

Connect a signal from a dot generator across the antenna terminals. Center the dots on the screen by adjusting the vertical and horizonal centering controls. Adjust the brightness of each beam so that each color dot is easily observed using the screen and difference controls. If necessary adjust the focus control. If necessary adjust the 3 beam positioning magnets and the blue beam lateral magnet (M15) for best convergence at center of the screen. Note which of the three dots require positioning. In Fig.11 the dashed lines indicate the direction of dot movement by its associated beam positioning magnet. The solid line indicate the direction of blue dot movement by adjusting the blue beam lateral corrector magnet. Each magnet has a slight effect on the two beams other than the one it is intended to control. For this reason minimum adjustment of the magnet is essential. Complete convergence is indicated when a single white dot with no color fringing around its edge is obtained.

HORIZONTAL DYNAMIC CONVERGENCE ADJUSTMENTS

Leave dot pattern generator connected as under "Dynamic Convergence Adjustments". Select one horizontal row of dots near center of the screen. Adjust the red and green horizontal amplitude controls and the red and green tilt trimmer (B4, B5) so that the red and green dots are symmetrically spaced with respect to each other along a horizontal row from left to right near center of the screen. The dots should be kept in focus. Adjust the red and green beam positioning magnets for convergence of the red and green dots horizontally. Adjust the blue horizontal amplitude control and the blue tilt trimmer (B6) until the blue dots are symmetrically spaced away from the superimposed red and green dots in horizontal dot group. Adjust the three beam positioning magnets for convergence of the blue, red and green dots horizontally.

VERTICAL DYNAMIC CONVERGENCE ADJUSTMENT

Leave dot generator connected as under "Dynamic Convergence Adjustments". Choose a vertical column of dots near the center of the screen. Notice that these dots are converged near the center of the screen and become over converged away from the center of the screen toward top and bottom. Adjust the red, green and blue vertical amplitude and tilt controls to form similar triangle groups along a vertical line near center of the screen. Adjust the three beam positioning magnets to converge the red, green and blue triangle groups along a straight vertical line near center of the screen. Check purity and if necessary adjust the blue beam lateral corrector magnet and the three beam positioning magnets for best overall convergence.

BACKGROUND AND SCREEN CONTROL ADJUSTMENTS

Turn the set on and set the contrast chroma controls fully counterclockwise. Set the brightness control fully clockwise. Set the master screen control approximately 1/4 turn from fully clockwise position. Set the blue and green screen controls 1/4 turn from fully clockwise. Adjust the blue and green difference controls until the raster appears grey (less white). If necessary readjust the screen controls.

Select a station transmitting a black and white test pattern and adjust the contrast and brightness controls for a low brightness signal. Adjust the blue and green difference controls for a gray (less white) picture. If when adjusting the brightness control, a color start to tint the screen, adjust the screen control corresponding to this color until the bright portions are white or grey again. Readjust the brightness control for normal brightness. Reset the difference controls so that brightness portions of picture appear white. Repeat the above procedure until minimum tinting occurs over the usable range of the brightness control.

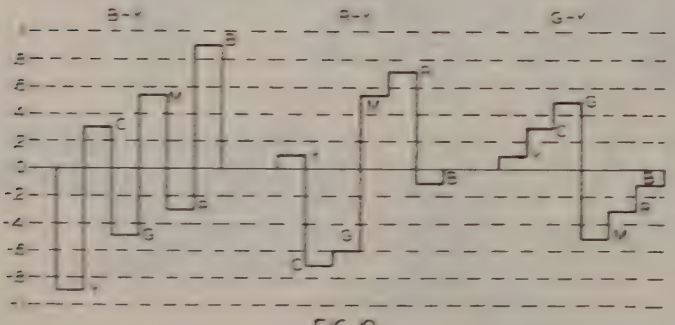

FIG.10

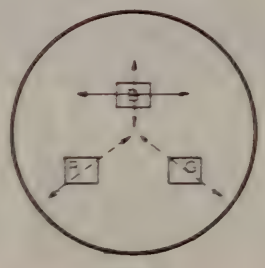

FIG.11

PARTS LIST AND DESCRIPTIONS

TUBES (SYLVANIA, GENERAL ELECTRIC, WESTINGHOUSE)

ITEM No.	USE	REPLACEMENT DATA: HOFFMAN PART No.	REPLACEMENT DATA: STANDARD REPLACEMENT	RETMA BASE TYPE	NOTES
V1	RF Amplifier	6BQ7A	6BQ7A	9AJ	
V2	Mixer-Osc.	6J6	6J6	7BF	
V3	1st. Video IF Amp.	6DC6	6DC6	7CM	
V4	2nd. Video IF Amp.	6DC6	6DC6	7CM	
V5	3rd. Video IF Amp.	6DC6	6DC6	7CM	
V6	4th. Video IF Amp.	6CB6	6CB6	7CM	
V7	Video Output	12BY7	12BY7	9BF	
V8	AGC Keying-Color Killer	6AN8	6AN8	9DA	
V9	1st. Sound IF Amp.-Vert. Oscillator	6U8	6U8	9AE	
V10	2nd. Sound IF Amp.-Sync Phase Inv.	6U8	6U8	9AE	
V11	Ratio Detector	6AL5	6AL5	6BT	
V12	AF Amplifier-AGC Clamper	6AV6	6AV6	7BT	
V13	Audio Output	6AQ5	6AQ5	7BZ	
V14	Sync Separator-1st. Chroma Amp.	6U8	6U8	9AE	
V15	Vert. Output	6BL7GT	6BL7GT	9BD	
V16	Horiz. AFC	6AL5	6AL5	6BT	
V17	Horiz. Mult.	6SN7GT	6SN7GT	9BD	
V18	Horiz. Output	6CB6	6CB6	9GD	
V19	Damper	6AU4GT	6AU4GT	4CG	6BL4 used as an alternate
V20	HV Rectifier	1A2	1A2	9DT	
V21	Diode Coupler	1A2	1A2	9DT	
V22	HV Doubler	1A2	1A2	9DT	
V23	Voltage Regulator	5BK4	5BK4	5CG	
V24	Burst Keying - Chroma Sync Phase Detector	6BJ7	6BJ7	9AX	
V25	2nd. Chroma Amp.	6CL6	6CL6	9BV	
V26	Chroma Reference Osc. Control-Chroma Ref. Osc.	6U8	6U8	9AE	
V27	B-Y Demodulator-R-Y Demodulator	12BH7	12BH7	9A	

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DENVER, COLORADO

CATHODE-RAY TUBE

ITEM No.	REPLACEMENT DATA: HOFFMAN PART No.	CBS PART No.	GENERAL ELECTRIC PART No.	SYLVANIA PART No.	WESTINGHOUSE PART No.	RETMA BASE TYPE	NOTES
V28	21AXP22			21AXP22		24W	

ELECTROLYTIC CAPACITORS

ITEM No.	RATING: CAP.	RATING: VOLT	REPLACEMENT DATA: HOFFMAN PART No.	MALLORY PART No.	PYRAMID PART No.	SANGAMO PART No.	NOTES
C1	200	300	4276		TM-200-250	T-125	
C2	200	300	4276		TM-200-250	T-125	
C3	90	475	4217A	FP187	TM-90-475	S-305	
C4	200	300	4216A		TM-200-250		
C5	1000	15	4203A		TD-1000-15	S-020	
C6	2	25	4202A	TC302	TD-2-25	MMT-0505	
C7	5	25	4202A	TC50	TD-5-25	MMT-0505	
C8A	▲10	450	4213A	FP231	TM-D10-450	D-200	
B	■10	450					
C9	4	150	4219A	TC40	TD-4-150	FM-1504	
C10	4	50	4221A	TC30	TD-4-50	MMT-0505	
C11A	▲10	450	4214A	FP375.8	TM-T10-450	T-125	
B	■10	450					
C	10	450					Note 1
C12	4	50	4237A		TD-4-50NP	FM-0510 * FM-0510 *	Note 2
C13	25	50	4224A	TC36	TD-25-50	FM-0505	
C14	10	25	4218A	TC22	TD-10-25	FM-0010	Note 3
C15	500	3	4222A		TD-500-3NP	MTE-06100 * MTE-06100 *	Note 2
C16	10	25	4218A	TC22	TD-10-25	FM-0010	
C17	10	25	4218A	TC22	TD-10-25	FM-0010	
C18	4	150	4219A	TC40	TD-4-150	FM-1504	

Note 1. C12C is not used.
Note 2. Non-polarized unit.
Note 3. Some versions may use a non-polarized unit in this application (part #4206A).
* Connect negative leads together.

FIXED CAPACITORS

Capacity values given in the rating column are in mfd. for Paper Capacitors, and in mmfd. Mica and Ceramic Capacitors.

ITEM No.	RATING: CAP.	RATING: VOLT	REPLACEMENT DATA: HOFFMAN PART No.	CENTRALAB PART No.	ERIE PART No.	MALLORY PART No.	NOTES
C19	3-8			829-10			
C20	3-8			829-10			
C21	800						
C22	3			TCZ-3R3	NP0A-030	ZT-553	
C23	.5-3			829-3	3115-01-0R5	CTS65A	
C24	120			DD-121	831-121	UC-5312	
C25	800						
C26	800						
C27	800						
C28	51			DD-500	831-520	UC-545	
C29	.5-3			829-3	3115-01-0R5	CTS65A	
C30	10			TCZ-10	NP0A-100	ZT-541	
C31	5						
C32	1500			DD-152	801-0015	DC-5215	
C33	1500			DD-152	801-0015	DC-5215	
C34	6.8			TCZ-6R8	NP0A-0R8	ZT-5568	
C35	800						

CAPACITORS (cont)

ITEM No.	RATING CAP.	RATING VOLT.	REPLACEMENT DATA HOFFMAN PART No.	CENTRALAB PART No.	ERIE PART No.	MALLORY PART No.	NOTES
C36	800						
C37	1000		14031	DD-102	801-001	DC-521	
C38	5000		4029	DD-502	811-005	DC-525	
C39	5000		4029	DD-502	811-005	DC-525	
C40	24		14056	TCZ-24	NP0K-240		
C41	1500		4096	DD-152	801-0015	DC-5215	
C42	820			D6-821	811-821		
C43	1500		4096	DD-152	801-0015	DC-5215	
C44	62	2000					
C45	100			DD-101	801-101	UC-531	
C46	1000		14031	DD-102	801-001	DC-521	
C47	1000		14031	DD-102	801-001	DC-521	
C48	680		4042	DD-681	811-681	UC-5368	
C49	1500		4096	DD-152	801-0015	DC-5215	
C50	1000		14031	DD-102	801-00[illegible]	DC-521	
C51	680		4042	DD-681	811-681	UC-5368	
C52	1000			DD-102	801-001	DC-521	
C53	680		4042	DD-681	811-681	UC-5368	
C54	1000		14031	DD-102	801-001	DC-521	
C55	1000		14031	DD-102	801-001	DC-521	
C56	91			TCZ-91	NP0-337-910		
C57	150			TCZ-150	NP0-334-151	MCE236	
C58	1500		4096	DD-152	801-0015	DC-5215	
C59	3700						
C60	470	1000		DD-471	1R5KV-471	DC30347	
C61	10000		4097	DD-103	811-01	DC-511	
C62	10000		4097	DD-103	811-01	DC-511	
C63	6.8			TCZ-6R8	NP0A-6R8	ZT-5568	
C64	10		4027	TCZ-10	NP0A-100	ZT-541	
C65	82			TCZ-82	NP0-337-820		
C66	47		14057	DD-470	831-470	UC-5447	
C67	5000		4029	DD-502	811-005	DC-525	
C68	5000		4029	DD-502	811-005	DC-525	
C69	56		4034	DD-560	831-560	UC-5456	
C70	5000		4029	DD-502	811-005	DC-525	
C71	5000		4029	DD-502	811-005	DC-525	
C72	1000		14031	DD-102	801-001	DC-521	
C73	1000		14031	DD-102	801-001	DC-521	
C74	10000		4097	DD-103	811-01	DC-511	
C75	10000		4097	DD-103	811-01	DC-511	
C76	.5	200	4110			PT405	
C77	.1	400	4150	DF-104		PT401	
C78	5000		4029	DD-502	811-005	DC-525	
C79	10000		4097	DD-103	811-01	DC-511	
C80	330		4065	DD-331	811-331	UC-5333	
C81	47		14057				Note 4
C82	10000		4097	DD-103	811-01	DC-511	
C83A	2000					DC-522	
B	5000		♦H9695	♦PC-100	♦1405-01	DC-525	
C	5000					DC-525	
C84	4700	500	4035			MCE465	
C85	.1	400	4150	DF-104		PT401	
C86	.25	400	4117			PT4025	
C87	1000	1500	14106	DD30-102	1R5KV-102	DC-3021	
C88	1000		14031	DD-102	801-001	DC-521	
C89	1000		14031	DD-102	801-001	DC-521	
C90	5000		4029	DD-502	811-005	DC-525	
C91	.05	200	4101	DF-503		PT415	
C92	3900	500				MCB463	
C93	330	500	4010				
C94	18			TCZ-18	NP0K-180		
C95	470	500	14050	DD-471	811-471	MCB245	
C96	10000		4097	DD-103	811-01	DC-511	
C97	.1	600	4150	DF-104		PT601	
C98	140	3000					Note 4
C99	140	3000					Note 4
C100	.25	600	4139			PT6025	
C101	.25	1000					
C102	.047	600	4133	DF-503		PT6147	
C103	1200	15000	14093				
C104	500	10000	4062	TV3-502	413	HV20035A	
C105	1000	15000	14094				
C106	2000	30000	14092				
C107	1000	1500		DD30-102		DC3021	Note 5
C108	680	1000	4042	DD30-681	1R5KV-681	DC30368	
C109	10000		4097	DD-103	811-01	DC-511	
C110	10000		4097	DD-103	811-01	DC-511	
C111	.25	1000					
C112	.25	1000					
C113	.47	200	4172			PT4047	
C114	360	2500					
C115	360	2500					
C116	150	2500					
C117	.0022	400	4136				
C118	140	3000					Note 4
C119	.0022	400	4136				
C120	140	3000					Note 4
C121	.0022	400	4136				
C122	140	3000					Note 4
C123	.22	400	4130			PT4022	
C124	10		14058	DD-100	831-100	UC-541	
C125	120		4072	TCZ-120	NP0-333-121		
C126	100		14077	DD-101	801-101	MCB235	
C127	10000		4097	DD-103	811-01	DC-511	
C128	10000		4097	DD-103	811-01	DC-511	
C129	10000		4097	DD-103	811-01	DC-511	
C130	10000		4097	DD-103	811-01	DC-511	
C131	5000		4029	DD-502	811-005	DC-525	
C132	5000		4029	DD-502	811-005	DC-525	
C133	5000		4029	DD-502	811-005	DC-525	Note 6
C134	22	500					
C135	1000		14031	DD-102	801-001	DC-521	
C136	1000		14031	DD-102	801-001	DC-521	
C137	10000		4097	DD-103	811-01	DC-511	
C138	.22	200	4131			PT4022	
C139	2			TCZ-2R2	NP0A-2R2		
C140	5000		4029	DD-502	811-005	DC-525	
C141	10000		4097	DD-103	811-01	DC-511	
C142	220		4084	DD-221	811-221	UC-5322	
C143	82			DD-820	801-820		
C144	5000		4029	DD-502	811-005	DC-525	
C145	1000		14031	DD-102	801-001	DC-521	
C146	.022	400		DF-203	817-02	PT4122	
C147	10000		4097	DD-103	811-01	DC-511	
C148	15	1000		DD-150			
C149	.022	400		DF-203	817-02	PT4122	

PARTS LIST AND DES

CAPACI

ITEM No.	RATING CAP.	RATING VOLT.	REPLACEMENT DATA HOFFMAN PART No.	CENTRALAB PART No.	E PAR
C150	10000		4097	DD-103	811-(
C151	27	1000			
C152	1.5			TCZ-1R5	NP0
C153	120			DD-121	811-(
C154	10000		4097	DD-103	811-(
C155	.01	600		DD-103	GP3
C156	.01	600		DD-103	GP3

Note 4. Not used in some versions.
Note 5. Some versions use 10000MMF in this application (part
Note 6. Some versions use 1000MMF in this application (part
Note 7. Some versions may use a 1.5-7MMF variable trimme
Note 8. Some versions may use .047MFD in this application.
♦ Items C83A, C83B, C83C, R92A, R92B, R92C are combine

CONT

ITEM No.	RATING RESISTANCE	RATING WATTS	REPLACEMEN HOFFMAN PART No.	CENTRALAB PART No.	CLAROST PART N
R1A	1Meg		4802A		
B	500Ω				
C	2000Ω				
D	Switch				
R2A	1000Ω		4812A	AB-5	A47-1000
B	Shaft		Not Req.	AK-4	KSS-3
R3A	1000Ω		4808A	F1-4	
B	1000Ω			R2-4	
R4A	10KΩ		4831A	AB-14	A47-10K
B	Shaft		Not Req.	AK-4	KSS-3
R5A	500KΩ		4803A	F1-40	
B	500KΩ			R2-40	
R6A	1000Ω	2	4813A	F7-68	
B	1Meg			R2-51	
R7A	500KΩ		4829A	AB-59	A47-500
B	Shaft		Not Req.	AK-4	KSS-3
R8A	2000Ω		4810A	F1-9	
B	2000Ω			R2-9	
R9A	1000Ω		4809A	F1-4	
B	2000Ω			R2-9	
R10A	1000Ω		4808A	F1-4	
B	1000Ω			R2-4	
R11A	1.5Meg		4832A	AB-742	A47-1.5M
B	Shaft		Not Req.	AK-4	KSS-3
R12A	10KΩ		4830A	AB-14	A47-10K
B	Shaft		Not Req.	AK-1	FKS-½
R13A	250KΩ		4824A	AB-50	A47-250
B	Shaft		Not Req.	AK-1	FKS-½
R14A	250KΩ		4824A	AB-50	A47-250
B	Shaft		Not Req.	AK-1	FKS-½
R15A	500KΩ		4806A	AB-59	A47-500
B	Shaft		Not Req.	AK-1	FKS-½
R16A	100Ω	2	4815A		
B	100Ω	2			
R17A	200Ω	2	4814A		
B	200Ω	2			
R18A	5000Ω	½	4817A	AB-10	A47-500
B	Shaft		Not Req.	AK-1	FKS-½
R19	7.5Meg		4839A		RTV-53
R20A	500KΩ	½	4816A	AB-59	A47-500
B	Shaft		Not Req.	AK-1	FKS-½

♦♦Concentrikit Equivalent; K-6 Kit, Base Elements and Shaft

♦Concentrikit Equivalent; K-6 Kit, Base Elements and Shafts

†Concentrikit Equivalent; K-6 Kit, Base Elements and Shafts

††Concentrikit Equivalent; K-6 Kit, Base Elements and Shaft

RES

ITEM No.	RATING OHMS	RATING WATT	REPLACEMENT DATA HOFFMAN PART No.	IRC PART No.	NOTES
R21	47KΩ			BTS-47K	
R22	15KΩ				
R23	100KΩ			BTS-100K	
R24	180KΩ			BTS-180K	
R25	270KΩ			BTS-270K	
R26	470Ω			BTS-470	
R27	10KΩ				
R28	4700Ω			BTS-4700	
R29	15KΩ				
R30	220KΩ				
R31	15KΩ				
R32	4700Ω	1	24556	BTA-4700	
R33	27Ω		14534	BTS-27	
R34	3.9Meg		34650	BTS-3.9Meg	
R35	330KΩ		34531	BTS-330K	
R36	470KΩ		4622	BTS-470K	
R37	1.2Meg		34593	BTS-1.2Meg	
R38	10Meg		4655	BTS-10Meg	
R39	3900Ω 5%				
R40	5600Ω		4603	BTS-5600	
R41	2700Ω	1	24534	BTA-2700	
R42	6200Ω 5%				
R43	47Ω		4639	BTS-47	
R44	47KΩ		4559	BTS-47K	
R45	470Ω		4664	BTS-470	
R46	18Ω		14514	BTS-18	
R47	2700Ω	1	24534	BTA-2700	
R48	56Ω		4561	BTS-56	
R49	47KΩ		4559	BTS-47K	
R50	470Ω		4664	BTS-470	
R51	39KΩ 5%		24637		
R52	2700Ω	1	24534	BTA-2700	
R53	47Ω		4639	BTS-47	
R54	3900Ω 5%		4654		
R55	470Ω		4664	BTS-470	

CAPACITORS (cont)

ITEM No.	RATING CAP.	RATING VOLT.	REPLACEMENT DATA HOFFMAN PART No.	CENTRALAB PART No.	ERIE PART No.	MALLORY PART No.	NOTES
C36	680						
C37	1000		14031	DD-102	801-001	DC-521	
C38	5000		4029	DD-502	811-005	DC-535	
C39	5000			DD-502	811-005	DC-535	
C40	24		14054	TC2-24	NPO5-240		
C42	4096		4096	DD-152	901-0015	DC-5315	
C43	820			DE-821	811-021		
C44	1500			DD-152	901-0015	DC-5315	
C45	82	2000					
C45	100			DD-101	801-101	UC-531	
C46	1000		14031	DD-102	801-001	UC-521	
C47	1000		14031	DD-102	801-001	DC-521	
C48	680		4042	DD-681	811-681	DC-5368	
C49	1500			DD-152	901-0015	DC-5315	
C50	1000		14031	DD-102	801-001	DC-521	
C51	680		4042	DD-681	811-681	UC-5368	
C52	1000			DD-102	801-001	DC-521	
C53	680		4042	DD-681	811-681	DC-5368	
C54	1000		14031	DD-102	801-001	DC-521	
C55	1000		14031	DD-102	801-001	DC-521	
C56	91			TC2-91	NP0-337-910		
C57	150			TC2-150	NP0-334-151	MCE330	
C58	1500			DD-153	801-0015	DC-5315	
C59	3700						
C60	470	1000		DD-471	IR5KV-471	DC30347	
C61	10000		4097	DD-103	811-01	DC-512	
C62	10000		4097	DD-103	811-01	DC-511	
C63	6.8			TC2-6R8	NP0A-6R8	DC-5568	
C64	10		4027	TC2-10	NP0A-100	DC-541	
C65	82			TC2-82	NP0-337-820		
C66	47		14057	DD-470	831-470	UC-5647	
C67	5000		4029	DD-502	811-005	DC-535	
C68	5000		4029	DD-502	811-005	DC-535	
C69	56		4024	DD-560	831-560	DC-5456	
C70	5000		4029	DD-502	811-005	DC-535	
C71	5000		4029	DD-502	811-005	DC-535	
C72	1000		14031	DD-102	801-001	DC-521	
C73	1000		14031	DD-102	801-001	DC-521	
C74	30000		4097	DD-103	811-01	DC-511	
C75	10000		4097	DD-103	811-01	DC-511	
C76	47	200	4110			DT405	
C77	.1	400	4150	DF-104		DT401	
C78	5000		4029	DD-502	811-005	DC-535	
C79	10000		4097	DD-103	811-01	DC-511	
C80	330		4065	DD-331	831-331	UC-5333	
C81	47		14057				Note 4
C82	10000		4097	DD-103	811-01	DC-511	
C83A	2000					DC-522	
B	5000		★98695	★DC-100	★1405-01	DC-525	
C	5000					DC-525	
C84	4700	500	4035			MCE445	
C85	47	400	4150	DF-104		DT401	
C86	25	400	4117			DT4025	
C87	1000	1500	14106	DD30-102	IR5KV-102	DC-3021	
C88	1000		14031	DD-102	801-001	DC-521	
C89	1000		14031	DD-102	801-001	DC-521	
C90	5000		4029	DD-502	811-005	DC-535	
C91	05	200	4101	DF-503		DT415	
C92	3500	500				MC3463	
C93	330	500	4010				
C94	10			TC2-18	NP0K-180		
C95	470	500	14050	DD-471	811-471	MCB345	
C96	10000		4097	DD-103	811-01	DC-511	
C97	.1	600	4150	DF-104		DT601	
C98	140	3000					Note 4
C99	140	3000					Note 4
C100	25	600	4139			DT625	
C101	.25	1000					
C102	.047	600	4133	DF-503		DT647	
C103	1200	1500	14093				
C104	500	10000	4062	TV3-502	413	HV20035A	
C105	1000	1500	14094				
C106	2000	3000	14092				
C107	1000	1500		DD30-103		DC3021	Note 5
C108	680	1000	4042	DD30-681	IR5KV-681	DC30368	
C109	10000		4097	DD-103	811-01	DC-511	
C110	10000		4097	DD-103	811-01	DC-511	
C111	25	1000					
C112	.25	1000					
C113	47	500	4172			PT4047	
C114	360	2500					
C115	360	2500					
C116	150	2500					
C117	.0022	400	4136				Note 4
C118	1410	3000					
C119	.0022	400	4136				Note 4
C120	140	3000					
C121	.0022	400	4136				Note 4
C122	140	3000					
C123	.22	400	4130			PT4022	
C124	50		14058	DD-100	831-100	UC-541	
C125	120		4072	TC2-120	NP0-333-121		
C126	100		14077	DD-101	801-101	MCB335	
C127	10000		4097	DD-103	811-01	DC-511	
C128	10000		4097	DD-103	811-01	DC-511	
C129	10000		4097	DD-103	811-01	DC-511	
C130	10000		4097	DD-103	811-01	DC-511	
C131	5000		4029	DD-502	[illegible]05	DC-525	
C132	5000		4029	DD-502	811-005	DC-525	
C133	5000		4029	DD-502	811-005	DC-525	Note 6
C134	33	500					
C135	1000		14031	DD-102	801-001	DC-521	
C136	1000		14031	DD-102	801-001	DC-521	
C137	10000		4097	DD-103	811-01	DC-511	
C138	22	200	4121			PT4023	
C139	2			TC2-2R2	NP0A-2R2		
C140	5000		4029	DD-502	811-005	DC-525	
C141	10000		4097	DD-103	811-01	DC-511	
C142	220		4084	DD-221	811-021	UC-5322	
C143	82			DD-820	801-820		
C144	5000		4029	DD-502	811-005	DC-525	
C145	1000		14031	DD-102	801-001	DC-521	
C146	333	400		DF-305	817-03	PT4123	
C147	10000		4097	DD-103	811-01	DC-511	
C148	15	1000		DD-150			
C149	.022	400		DF-303	817-02	PT4122	

PARTS LIST AND DESCRIPTIONS (Continued)

CAPACITORS (cont)

ITEM No.	RATING CAP.	RATING VOLT.	REPLACEMENT DATA HOFFMAN PART No.	CENTRALAB PART No.	ERIE PART No.	MALLORY PART No.	NOTES
C150	10000		4097	DD-103	811-01	DC-511	
C151	27	1000					
C152	1.5			TC2-1R5	NP0A-1R5	ZT-5R15	Note 7
C153	120			DD-121	811-121		
C154	10000		4097	DD-103	811-01	DC-511	
C155	01	600		DD-103	GP3-333-103	PT611	Note 8
C156	01	600		DD-103	GP3-333-103	PT611	Note 8

Note 4. Not used in some versions.
Note 5. Some versions use 10000MMF in this application (part #4097).
Note 6. Some versions may use a 1.5-7MMF variable trimmer in this application.
Note 7. Some versions may use .047MFD in this application.
Note 8. Some versions may use .047MFD in this application.
★ Items C83A, C93B, C93C, R92A, R92B, R92C are combined in one unit.

CONTROLS

ITEM No	RATING RESISTANCE	RATING WATTS	REPLACEMENT DATA HOFFMAN PART No.	CENTRALAB PART No.	CLAROSTAT PART No.	IRC PART No.	MALLORY PART No.	INSTALLATION NOTES
R1A	1Meg	½	4903A					Volume (Panel)
B	5000	½						Contrast (Center) Tap at 425Ω
C	2000Ω	½						Chroma (Rear)
D	Switch							Attach to RIC.
R2A	1000Ω	½	4613A	AB-5	A47-1000-S	QI1-103	U-4	Blue Horizontal Amplitude
B	Shaft		Not Req.	AK-4	KSS-3	Not Req.	Not Req.	Attach to R2A.
R3A	1000Ω	½	4608A	F1-6		QJ-856++	UF13L	Red Horizontal Amplitude (Panel)
B	1000Ω	½		R2-4			UR5L	Green Horizontal Amplitude (Rear)
R4A	10KΩ	½	4631A	AB-14	A47-10K-S	QI1-116	U-20	Chroma Threshold
B	Shaft		Not Req.	AK-4	KSS-3	Not Req.	Not Req.	Attach to R4A.
R5A	5000KΩ	½	4606A	F1-40		QJ-860†	UF5L	Blue Difference (Panel)
B	500KΩ	½		R2-40			UR5L	Green Difference (Rear)
R6A	1000Ω	2	4615A	F7-68			WF13	Vertical Linearity (Panel)
B	1Meg	½					UR16L	Wire Wound
R7A	500KΩ	½	4639A	AB-59	A47-500K-S	QI1-133	U-50	Vertical Height (Rear)
B	Shaft		Not Req.	AK-4	KSS-3	Not Req.	Not Req.	Master Brightness
R8A	2000Ω	½	4610A	F1-9		QJ-858††	UF23L	Attach to R7A.
B	2000Ω	½		R2-9			UR23L	Red Vertical Amplitude (Panel)
R9A	1000Ω	½	4609A	F1-6		QJ-857★	UF15L	Green Vertical Amplitude (Rear)
B	2000Ω	½		R2-9			UR23L	Blue Vertical Amplitude (Rear)
R10A	1000Ω	½	4608A	F1-6		QJ-856++	UF13L	Red Vertical Tilt (Panel)
B	1000Ω	½		R2-4			UR13L	Green Vertical Tilt (Rear)
R11A	1.5Meg	½	4632A	AB-742	A47-1.5Meg-S	QI1-138	U-155	Vertical Hold
B	Shaft		Not Req.	AK-4	KSS-3	Not Req.	Not Req.	Attach to R12A.
R12A	10KΩ	½	4630A	AB-14	A47-10K-S	QI1-116	U-20	Horizontal Hold
B	Shaft		Not Req.	AK-1	FKS-½	Not Req.	Not Req.	Attach to R13A.
R13A	250KΩ	½	4634A	AB-50	A47-250K-S	QI1-130	U-46	Blue Screen
B	Shaft		Not Req.	AK-1	FKS-½	Not Req.	Not Req.	Attach to R13A.
R14A	250KΩ	½	4634A	AB-50	A47-250K-S	QI1-130	U-46	Green Screen
B	Shaft		Not Req.	AK-1	FKS-½	Not Req.	Not Req.	Attach to R14A.
R15A	500KΩ	½	4636A	AB-59	A47-500K-S	QI1-133	U-50	Master Screen
B	Shaft		Not Req.	AK-1	FKS-½	Not Req.	Not Req.	Attach to R15A.
R16A	100Ω	2	4615A					Horizontal Centering (Panel)
B	100Ω	2						Horizontal Centering (Rear)
R17A	500Ω	2	4614A					Vertical Centering (Panel)
B	200Ω	2						Vertical Centering (Rear)
R18A	500KΩ	½	4617A	AB-10	A47-500K-S	QI1-114	U-14	Horizontal Drive
B	Shaft		Not Req.	AK-1	FKS-½	Not Req.	Not Req.	Attach to R18A.
R19	7.5Meg	½	4619A		RTV-534			Focus
R20A	500KΩ	½	4618A	AB-59	A47-500K-S	QI1-133	U-50	High Voltage Adjustment
B	Shaft		Not Req.	AK-1	FKS-½	Not Req.	Not Req.	Attach to R30A.

++Concentrikit Equivalent; K-6 Kit, Base Elements and Shafts; Bil-105, P20-101 (Panel)
Bil-108, Ril-112 (Rear)
★Concentrikit Equivalent; K-6 Kit, Base Elements and Shafts; Bil-105, P20-101 (Panel)
Bil-110, Ril-112 (Rear)
†Concentrikit Equivalent; K-6 Kit, Base Elements and Shafts; Bil-112, P20-101 (Panel)
Bil-113, Ril-112 (Rear)
††Concentrikit Equivalent; K-6 Kit, Base Elements and Shafts; Bil-40, P20-101 (Panel)
Bil-110, Ril-112 (Rear)

RESISTORS

ITEM No	RATING OHMS	RATING WATT	REPLACEMENT DATA HOFFMAN PART No.	IRC PART No.	NOTES
R21	47KΩ	½		BTS-47K	
R22	15KΩ	½			
R23	100KΩ	½		BTS-100k	
R24	180KΩ	½		BTS-180K	
R25	270KΩ	½		BTS-270K	
R26	47KΩ	½		BTS-47K	
R27	10KΩ	½			
R28	4700Ω	½		BTS-4700	
R29	15KΩ	½			
R30	220KΩ	½			
R31	56KΩ	½			
R32	4700Ω	½	24556	BTA-4700	
R33	270	½	14534	BTS-27	
R34	3.3Meg	½	3469G	BTS-3.3Meg	
R35	330KΩ	½	3453L	BTS-330K	
R36	470KΩ	½	4623	BTS-470K	
R37	1.2Meg	½	24583	BTS-1.2Meg	
R38	10Meg	½	4655	BTS-10Meg	
R39	39000Ω 5%	½			
R40	5600Ω	1	4605	BTS-5600	
R41	27000	1	24534	BTA-2700	
R42	62000Ω 5%	½			
R43	47Ω	½	4639	BTS-47	
R44	47KΩ	½	4559	BTS-47K	
R45	470Ω	½	4664	BTS-470	
R46	68Ω	½	14514	BTS-18	
R47	270KΩ	½	24534	BTA-2700	
R48	56Ω	½	4561	BTS-56	
R49	47KΩ	½	4559	BTS-47K	
R50	470Ω	½	4664	BTS-470	
R51	39KΩ 5%	½	24537		
R52	2700Ω	½	24534	BTA-2700	
R53	47Ω	½	4639	BTS-47	
R54	39000 5%	½	4654		
R55	470Ω	½	4664	BTS-470	

ITEM No	RATING OHMS	RATING WATT	REPLACEMENT DATA HOFFMAN PART No.	IRC PART No.	NOTES
R56	10Ω	½	4603	BTS-10	
R57	330Ω	½	14644	BTS-330	
R58	5600Ω 5%	½	4603	BTS-5600Ω 5%	
R59	82000 5%	½	4641	BTS-82000 5%	
R60	82000 5%	½	4641	BTS-82000 5%	
R61	15KΩ	2	24600	BTS-15K	
R62	39000	2	24551	BTS-3900	
R63	68KΩ	½	4661	BTS-68K	
R64	560Ω	½	4607	BTS-560	
R65	47Ω	½	4639	BTS-47	
R66	56KΩ	½	24622	BTS-56K	
R67	10KΩ	½	4597	BTS-10K	
R68	270KΩ	½	4602	BTS-270K	
R69	47KΩ	½	4578	BTS-270M	
R70	10KΩ	½	4625	BTA-10K	
R71	82Ω	½	4598	BTS-82	
R72	100KΩ	½	4571	BTS-100K	
R73	27KΩ	½	24618	BTS-27K	
R74	18KΩ	½	4563	BTS-18K	
R75	1000Ω	½	4543	BTS-1000	
R76	68KΩ	½		BTS-68K	
R77	10KΩ	½		BTS-10K	
R78	10KΩ	½		BTS-10K	
R79	1Meg	½	4513	BTS-1Meg	
R80	6.8Meg	½	4803	BTS-6.8Meg	
R81	100KΩ	½	4571	BTS-100K	
R82	100KΩ	½	4511	BTS-100K	
R83	470KΩ	½	4623	BTS-470K	
R84	2.7Meg	½	24620	BTS-2.7Meg	
R85	150KΩ	½	4569	BTS-150K	
R86	47KΩ	½	4559	BTS-47K	Note 1
R87	39KΩ 5%	½	24626	BTS-39K 5%	
R88	1Meg	½	4514	BTS-1Meg	
R89	33000 5%	½	4646	BTS-3300 5%	
R90	4700 5%	½	14662	BTS-470 5%	

RESISTORS (cont)

ITEM No.	RATING OHMS	RATING WATT	REPLACEMENT DATA HOFFMAN PART No.	IRC PART No.	NOTES
R91	22000 5%	½	24535	BTS-2200 5%	
R92A	22KΩ	½		BTS-22K	
B	8200Ω	½	★820695	BTS-8200	
C	8200Ω	½		BTS-8200	
R93	1Meg	½	4614	BTS-1Meg	
R94	680KΩ	½	4676	BTS-680K	
R95	56KΩ	½	24602	BTS-56K	
R96	220KΩ	½	4658	BTS-220K	Note 3
R97	100Ω	½	4547	BTS-100	
R98	2.2Meg	½	4806	BTS-2.2Meg	
R99	10KΩ	½	4625	BTS-10K	
R100	100Ω	½	4547	BTS-100	
R101	47KΩ	½	4578	BTS-470	
R102	100KΩ	½	4650		
R103	1000Ω	½	4560		
R104	100KΩ	½	4571		
R105	100KΩ	½	4571		
R106	4.7Meg	½	24652		
R107	470KΩ	½	4623		
R108	680KΩ	½	24586	BTS-680K	
R109	56000 5%	1	24584		
R110	16000 5%	½	24514		
R111	100KΩ	½	4571		
R112	470Ω	½	4664		
R113	120KΩ 5%	½	24688		
R114	68000	½	4557		
R115	100Ω	½	4547		
R116	470KΩ	½	4623		
R117	100Ω	½	4547		
R118	17.5KΩ	10			
R119	39KΩ	3			
R120	120Ω	½	4546		
R121	4700Ω	½	4576		
R122	10000 5%	½	4659		
R123	50Meg	3	44597		
R124	2.7Meg	1	44609		
R125	6.8Meg	2	44810		
R126	1.2Meg	½	24593	BTS-1.2Meg	
R127	1.5Meg	½	4805		Note 1
R128	1000Ω	½	14695		
R129	1000Ω	½	4659		
R130	2000Ω	½	4669		
R131	470KΩ	½	4623	BTS-470K	
R132	10000 5%	½	4603	BTS-5600 5%	
R133	18KΩ 5%	½	24605	BTS-18K0 5%	
R134	12Meg	½	44608	BTS-12Meg	
R135	2.2Meg	½	24630	BTS-2.2Meg	
R136	22Meg	½	44638	BTS-22Meg	
R137	2.2Meg	½	24630	BTS-2.2Meg	
R138	68KΩ	1	24662	BTA-68K	
R139	12KΩ	½	4646	BTS-12K	
R140	47KΩ	½	4559	BTS-47K	Note 3
R141	1000Ω	½	4659	BTS-1000	
R142	10KΩ	½	4597	BTS-10K	
R143	10KΩ	½	4597	BTS-10K	
R144	56KΩ	½	4607	BTS-560	
R145	1000Ω	½	4659	BTS-1000	
R146	560Ω	½		BTS-560	
R147	18KΩ	½	4618	BTS-18K	
R148	470Ω	1	4631	BTA-470	
R149	3300Ω	½	4703A	1/2 A4590	Note 4
R150	220Ω	½	14638	BTS-220	
R151	10KΩ	½	4597	BTS-10K	
R152	5MΩ	½	4599	BTS-5Meg 5%	
R153	1Meg 5%	½	24586	BTS-1Meg 5%	
R154	3.7Meg	½	24630	BTS-3.7Meg	
R155	15KΩ	½	4618	BTS-15K	
R156	2200Ω	½	4650	BTS-2200	
R157	560Ω	½	4569	BTS-560	
R158	2700Ω	½	4579	BTS-2700	
R159	330KΩ	½	24631	BTS-330K	
R160	100KΩ	½	4571	BTS-100K	
R161	10KΩ	½	4597	BTS-10K	
R162	56KΩ	½	4599	BTS-56K	
R163	10KΩ	½	4597	BTS-10K	
R164	5600 5%	2	14673	BTS-560 5%	
R165	82KΩ 5%	2	24675	BTS-82K 5%	
R166	82KΩ 5%	2	24675	BTS-82K 5%	
R167	68000	2	24575	BTS-5600	
R168	15KΩ	2	24618	BTS-15K	
R169	10KΩ	½	4597	BTS-10K	
R170	100KΩ 5%	½		BTS-100K 5%	Note 5
R171	110KΩ 5%	2		BTS-110K 5%	Note 5
R172	22KΩ	2	24614	BTS-22K	
R173	82KΩ	2	24670	BTS-82K	
R174	270KΩ			BTS-270K	
R175	3700Ω	½	4579	BTS-3700	
R176	100KΩ	½	4511	BTS-100K	
R177	390KΩ			BTS-390K	
R178	2700Ω	½	4579	BTS-2700	
R179	100KΩ	½	4511	BTS-100K	
R180	560KΩ			BTS-560K	
R181	3700Ω	½	4579	BTS-3700	
R182	100KΩ	½	4511	BTS-100K	
R183	68KΩ	½	4665	BTS-68K	
R184	10KΩ	1	4644	BTA-10K	
R185	12KΩ	½	4646	BTS-12K	
R186	5000Ω	10	4705A	PWU-5000	
R187	33KΩ	½	24627	BTS-33K	
R188	120KΩ	½	24668	BTA-120K	
R189	56KΩ	½		BTS-56K	
R190	82KΩ	½	24670	BTS-82K	
R191	330Ω	½	4631	BTS-330	
R192	100KΩ	½	4511	BTS-100K	
R193	56KΩ	½	24652	BTS-56K	
R194	100KΩ	½	4511		Note 1

Note 1. Not used in some versions.
Note 2. Some versions use a 560Ω ½W resistor in this application.
Note 3. Some versions use a 56K ½W resistor in this application.
Note 4. Some versions use a 4000Ω 5W (WW) resistor in this application.
Note 5. Some versions use a single 56KΩ 2W 5% resistor in place of R170 & R171.
★ Items C83A, C93B, C93C, R92A, R92B, R92C are combined in one unit.

TRANSFORMER (POWER)

ITEM No.	RATING PRI.	RATING SEC. 1	RATING SEC. 2	RATING SEC. 3	REPLACEMENT DATA HOFFMAN PART No.	Halldorson PART No.	Merit PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.
T1	117VAC	715VAC	6.3VAC	5.0VAC	5062					
	② 3.1A	.430ADC	③1.8A	14.2A						
		Tap at 165VAC .290ADC								

TRANSFORMERS (SWEEP CIRCUITS)

ITEM No	USE	REPLACEMENT DATA HOFFMAN PART No.	Halldorson PART No.	Merit PART No.	RCA TYPE No.	Rem PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.
T2	Vert. Osc. Trans.	5127A	B6701	A-4003	20B79	V402	A-8123	26A04	A-97Y
T3	Horiz. Output Trans.	5152A							
T4	Vert. Output Trans.	5140A		A-3823		V307	A-8144	26S72	A-108X
T5A	Yoke-Horiz. (13MM)	5136A							
B	Vert. (107MM)								
T6	Horiz. Lin. Coil (.3-.3.3MH)	5305A		MWC-2	20B81	30R13A	WC-7	WC-23 ⑦	WC-13 ⑦
T7	Width Coil (.3-2.3MH)	5295A		MWC-2	20B81	30R13A	WC-7	WC-23 ⑦	WC-13 ⑦
T8	Horiz. AFC Trans.	5305A							
T9	Vert. Centering Choke	5141A							
T10	Horiz. Centering Choke	5294A							
T11	Horiz. Centering Choke (2.5-19MH)	5464	RF600 ⑥ ⑦	MWC-11 ⑦	21Z81 ⑦	30R16 ⑦	WC-5 ⑦	WC-18 ⑦	WC-12 ⑦
T12	Horiz Dynamic Convergence Amplitude Coil	5329A							
T13A	Green Dynamic	5138A							
B	Blue } Convergence								
C	Red } Yoke Assy.								
T14	Dynamic Convergence Inductor Assembly	5137A							

① Use 8 to 1 turns ratio.
② Enlarge mounting hole.
③ Adjust to maximum inductance.
④ Connect to terminals #1 and #2.
⑤ Connect to coded red and blue terminals.

TRANSFORMER (AUDIO OUTPUT)

ITEM No	IMPEDANCE PRI.	IMPEDANCE SEC.	REPLACEMENT DATA HOFFMAN PART No.	Halldorson PART No.	Merit PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.	NOTES
T15	5KΩ	3.4Ω	5142	Z1002	A-3019	A-3852	26S49	S-52	

PROPERTY OF
E. BLANKENSHIP
3924 MEADE ST.
DENVER, COLORADO

PARTS LIST AND DESCRIPTIONS (Continued)

SPEAKER

ITEM No.	RATINGS			REPLACEMENT DATA		NOTES
	SIZE	FIELD	V. C. IMP.	HOFFMAN PART No.	QUAM PART No.	
SP1	6½ x 10-5/8	PM	3.4Ω	H-9079		

COILS (RF-IF)

ITEM No.	USE	DC RES.		REPLACEMENT DATA				NOTES
		PRI.	SEC.	HOFFMAN PART No.	MEISSNER PART No.	MERIT PART No.	MILLER PART No.	
L1	IF Trap	0Ω						Wound on cap.
L2	IF Trap	0Ω						Wound on cap.
L3	Ant. Coils	0Ω CT	0Ω					
L4	IF Trap Coil	1Ω						
L5	Fil. Choke	0Ω						
L6	Neut. Coil	0Ω						
L7	RF, Mixer Grid & Osc. Coils	0Ω						
L8	Fil. Choke	0Ω						
L9	Feedback Coil	1.5Ω						
L10	RF Coil	0Ω						
L11	Conv. Plate	.1Ω						
L12	1st. Video IF	.3ΩCT		5298A				Includes 9MMF cap.
L13	41.25MC Trap	0Ω		5281A				Includes caps & resistors
L14	2nd. Video IF	0Ω		5317A				
L15	47.25MC Trap	0Ω		5316A				Tapped
L16	RF Coil	2.2Ω		5269A	19-1005		4612	10 Microhenries
L17	3rd. Video IF	.1Ω	.1Ω	5297A	17-5002 ■	TV-127 ■	6232 ■	
L18	4th. Video IF	.1Ω	.1Ω	5297A	17-5004 ▲	TV-125 ▲	6234 ▲	
L19	RF Choke	1.7Ω		5269A	19-1005		4612	10 Microhenries
L20	41.25MC Trap	0ΩCT		5324A				
L21	Series Peaking Coil	1Ω		5267A	19-1003		4608	4.7 Microhenries
L22	Series Peaking Coil	14Ω		5433	19-3160 ♦	TV-184 ♦	4644 ♦	150 Microhenries, wound on 39KΩ resistor
L23	3.58MC Trap	.8ΩCT		5282A				
L24	Shunt Peaking Coil	10Ω		5276A	19-3250	TV-185	6181	230 Microhenries
L25	Series Peaking Coil	11Ω		5313A	19-3250 ◓	TV-185 ◓	6181 ◓	255 Microhenries, wound on 100KΩ resistor
L26	Shunt Peaking Coil	11Ω		5314A	19-3300	TV-185	6130	280 Microhenries
L27	2nd. Sound IF	6.3Ω	3.7Ω	5593-1	16-3445	TV-113 ▲	6203 ▲	
L28	Ratio Det.	17Ω	1.6ΩCT	5252A	17-3497	TV-115	6205	Tertiary winding-.6Ω
L29	Horiz. Osc.	65Ω		5447	19-1576	TV-163	6210	
L30	RF Choke	1.8Ω		5268A	19-1005		4612	8.2 Microhenries
L31	RF Choke	.9Ω		5323A	19-6033		4628	33 Microhenries
L32	RF Choke	1.8Ω		5269A	19-1005		4612	10 Microhenries
L33	Series Peaking Coil	1Ω		5267A	19-1003		4608	4.7 Microhenries
L34	1st. Sound IF	.9ΩCT	2.3Ω	5300A				
L35	1st. Chroma Amp. Coil	3.3Ω		5301A				Includes 4.5MC trap
L36	RF Coil	30Ω		5266A	19-4950		4652	1 Microhenry
L37	Chroma Interstage Coil	4.2Ω	2.9Ω	5302A				
L38	Burst Takeoff Trans.	2.8ΩCT		5289A				
L39	7.16MC Trap	1.5Ω		5320A				
L40	Series Peaking Coil	3.5Ω			19-3036	TV-180	6176	39 Microhenries
L41	Chroma Amp. Plate Coil	5.7Ω		5288A				
L42	Chroma Amp. Output Trans.	3.4Ω	3.4Ω*	5303A				*Tapped ⓐ 2.4Ω
L43	Reference Osc. Plate Coil	5Ω		5291A				
L44	Shunt Peaking Coil	30Ω		5266A	19-4950		4652	1 Microhenry
L45	Chroma Ref. Osc. Coil	3Ω		5304A				Note 1
L46	Demodulator Grid Coil	1.3Ω		5292A				Tapped ⓐ .6Ω
L47	Series Peaking Coil	30Ω		5328A	19-4950		4652	1 Microhenry
L48	Series Peaking Coil	30Ω		5328A	19-4950		4652	1 Microhenry
L49	Series Peaking Coil	30Ω		5328A	19-4950		4652	1 Microhenry

■ Use adaptor plate and detune trap.
▲ Use adaptor plate .
♦ Parallel with 39KΩ resistor.
◓ Parallel with 100KΩ resistor.
Note 1. Secondary 1 - .7Ω (tuned), Secondary 2 - 1.2Ω, Secondary 3 - .7Ω.

FILTER CHOKE

ITEM No.	RATINGS			REPLACEMENT DATA					
	TOTAL DIRECT CURRENT	D. C. RESISTANCE	INDUCTANCE (0 CURRENT 1000 ∿)	HOFFMAN PART No.	Halldorson PART No.	Merit PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.
L50	290A DC	43Ω	2.1HY	5135A	C5037	C-2996	C-2326	26C44 ①	C-17X
L51	140A DC	43Ω	2.1HY	5135A	C5037	C-2996	C-2326	26C44 ①	C-17X

① Drill one new mounting hole.

PARTS LIST AND DESCRIPTIONS (Continued)

SELENIUM RECTIFIER

ITEM No.	RATING	REPLACEMENT DATA						NOTES
	CURRENT	HOFFMAN PART No.	FEDERAL PART No.	INTERNATIONAL PART No.	MALLORY PART No.	RADIO RECEPTOR PART No.	SARKES TARZIAN PART No.	
M1	.430ADC	10019	1319A	9RS500SL	9S750①			① Drill new mounting hole.
M2	.280ADC	10020	1371A	9RS300SL	9S750 ①			

FUSES

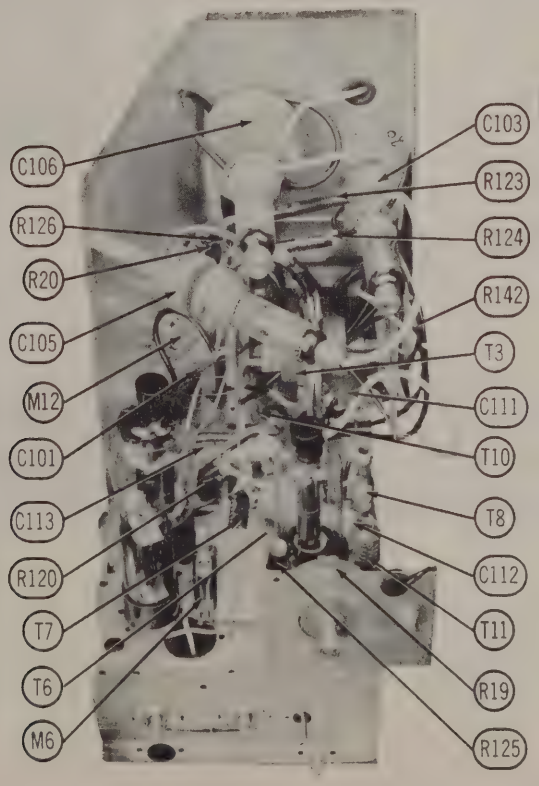
ITEM No.	TYPE	RATING	REPLACEMENT DATA					
			HOFFMAN PART No,		LITTELFUSE PART No.		BUSS PART No.	
			FUSE	HOLDER	FUSE	HOLDER	FUSE	HOLDER
M3			3/8" Piece #26 Wire					
M4			2 3/4" Piece #26 Wire					
M5			2 3/4" Piece #26 Wire					
M6	3AG	½A 250V	9867		312.500 (3AG ½A)	357001	AGC½	4405

CRYSTAL DIODES

ITEM No.	ORIG. TYPE	REPLACEMENT DATA		NOTES
		HOFFMAN PART No.	SYLVANIA PART No.	
M7	CK706A		1N60	Luminance Detector
M8	CK706A		1N60	Chroma Detector

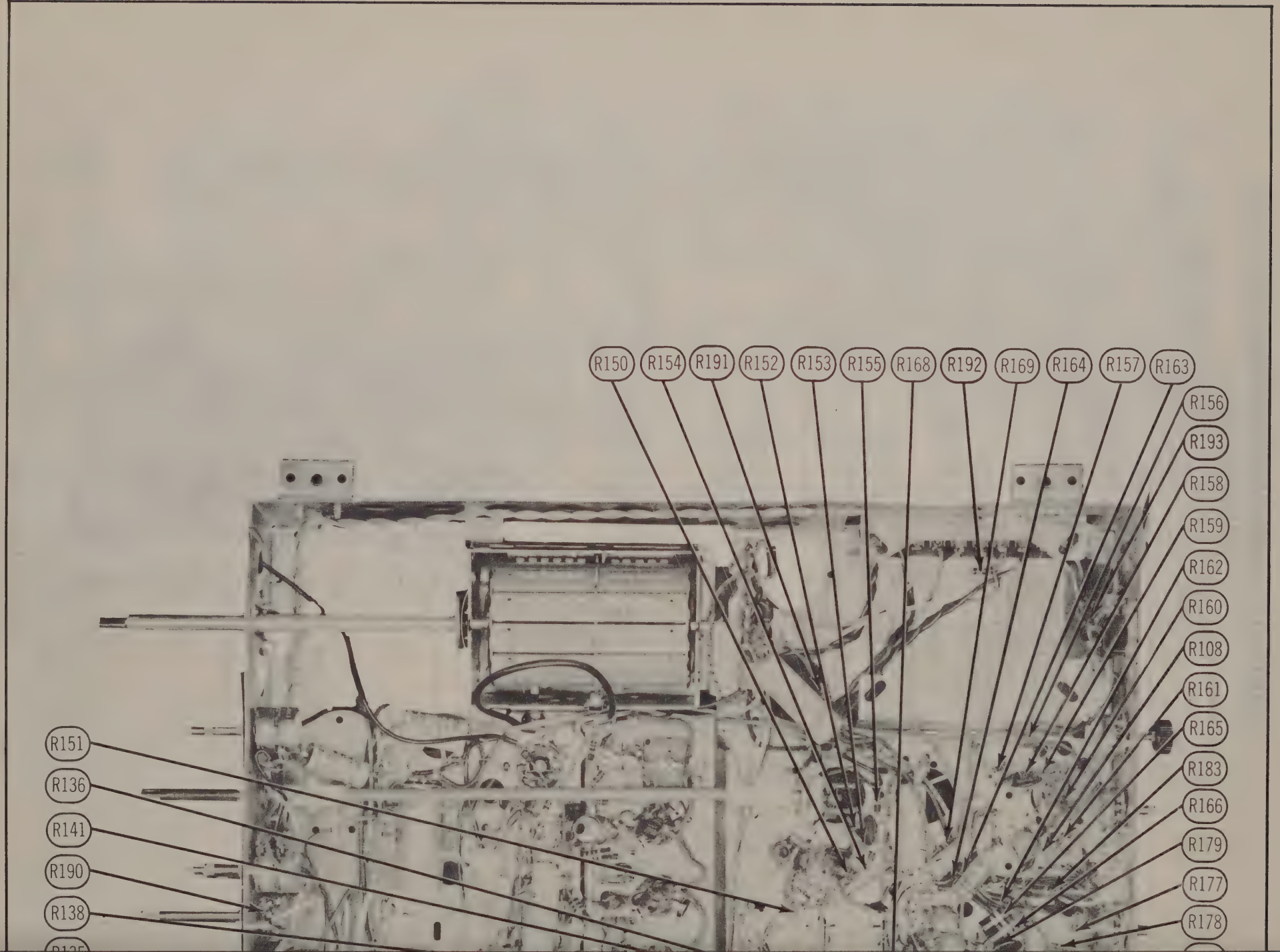
MISCELLANEOUS

ITEM No.	PART NAME	HOFFMAN PART No.	NOTES
M9	Dial Light	9505	#44
M10	Tuner	9860	
M11	Luminance Det. Assy.	5299A	Includes M7, coils, capacitors and R58
M12	Switch	6047	Width (Rotary-wafer type)
M13	Delay Line	10018	Luminance Channel
M14	Crystal		3579.545KC Osc.
M15	Magnet		Blue beam lateral corrector
M16	Magnet		Purity
M17	Magnetic Shield		Deflection yoke
M18	Rim Purity Magnet Assy.		
	Variable Trimmer (Air)	4421	Hue (5-25MMF)
A39	Trimmer Cap.		2nd. Chroma amp. screen bypass (170-780MMF)
B4	Trimmer Cap.	4426	Red horiz. tilt (25-280MMF)
B5	Trimmer Cap.	4426	Green horiz. tilt (25-280MMF)
B6	Trimmer Cap.	4426	Blue horiz. tilt (25-280MMF)

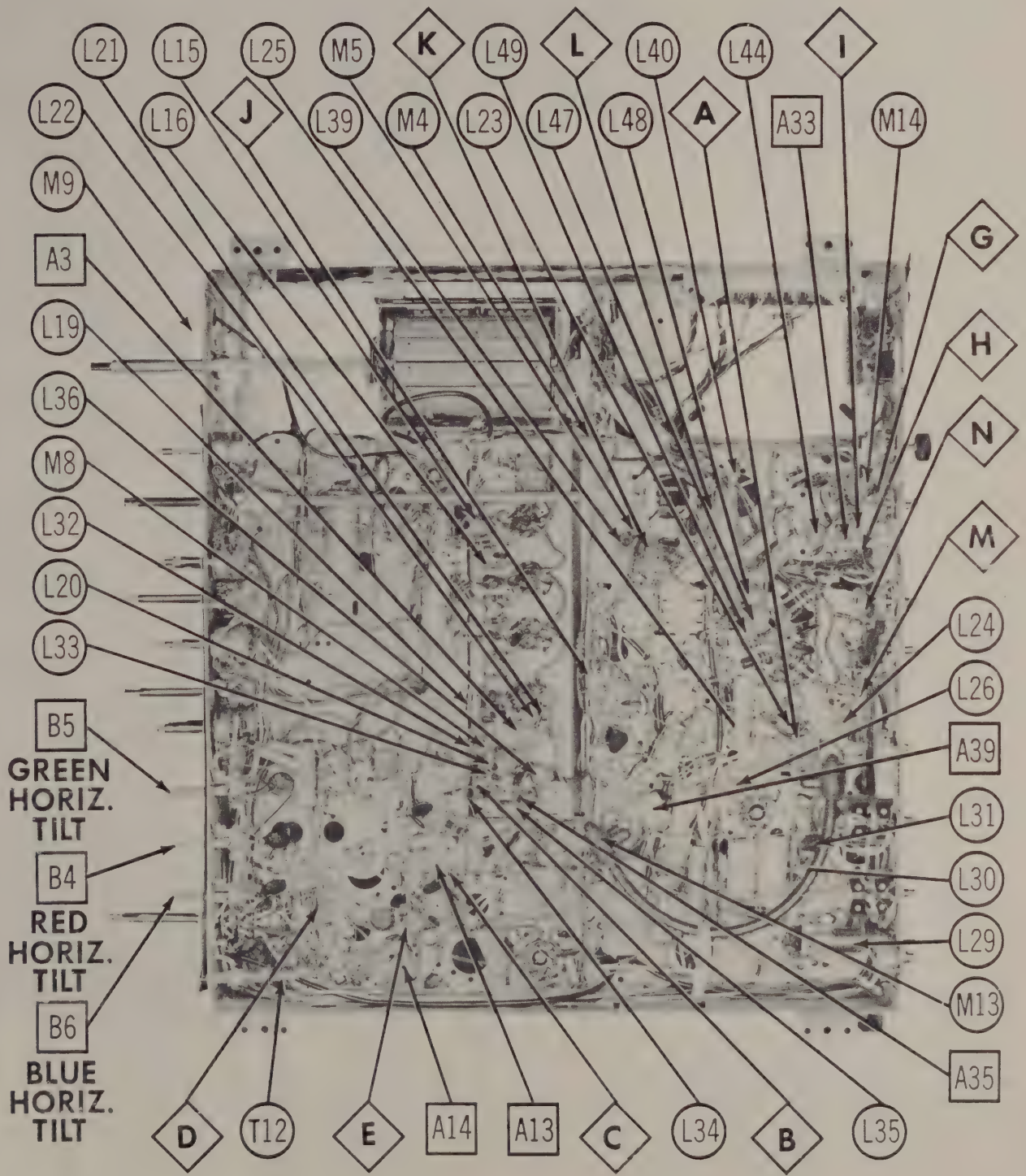


HIGH VOLTAGE COMPARTMENT

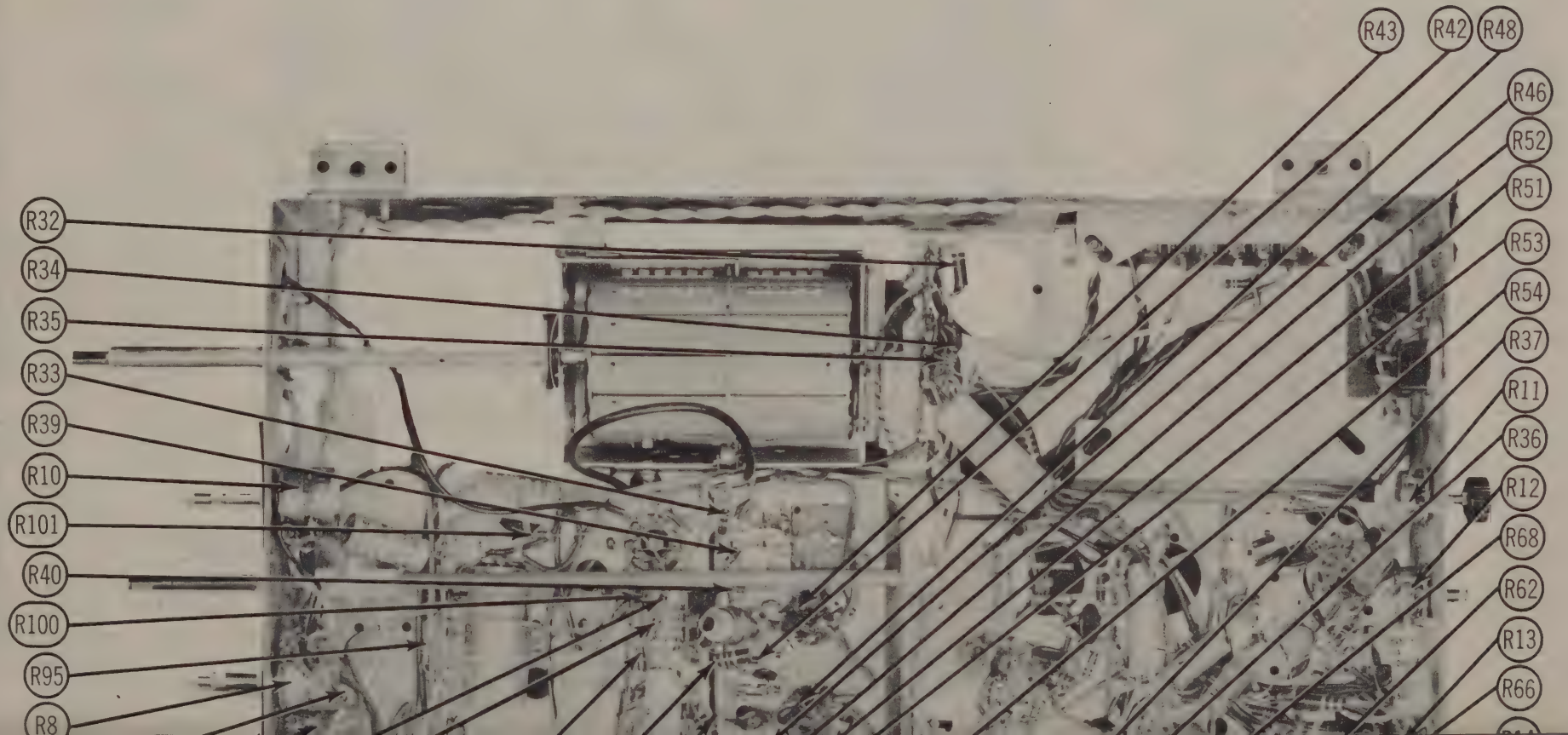
PROPERTY OF
L. F. BLANKENSHIP
3004 MEADE ST.
DENVER, COLORADO


R150
R154
R191
R152
R153
R155
R168
R192
R169
R164
R157
R163
R156
R193
R158
R159
R162
R160
R108
R161
R165
R183
R166
R179
R177
R178
R151
R136
R141
R190
R138

L. F. BLANKENSHIP
3824 MEADE ST.
DENVER, COLORADO



CHASSIS BOTTOM VIEW-TRANS., INDUCTOR AND ALIGNMENT IDENTIFICATION

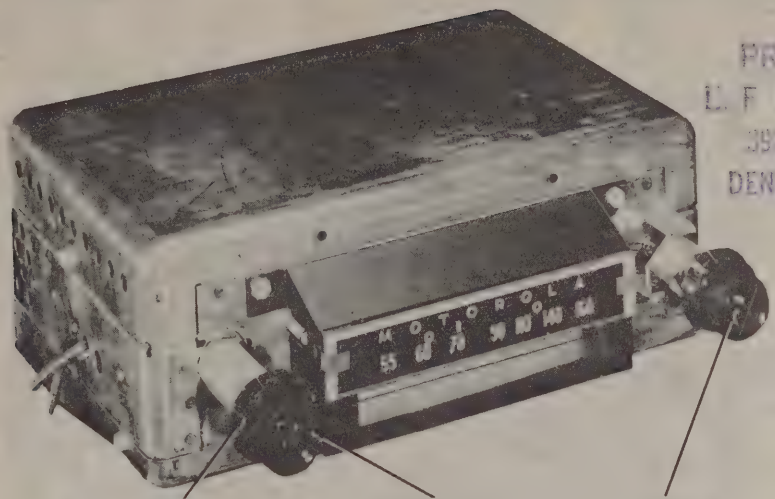

R43
R42
R48
R46
R52
R51
R53
R54
R37
R11
R36
R12
R68
R62
R13
R66
R32
R34
R35
R33
R39
R10
R101
R40
R100
R95
R8

PROPERTY OF
L. F. BLANKENSHIP
3[illegible] ST.
[illegible]

CHASSIS BOTTOM VIEW-CAPACITOR IDENTIFICATION

PROPERTY OF
L. F. BLANKENSHIP
3934 MEADE ST.
DENVER, COLORADO

MOTOROLA MODELS
CTM4, A



MOTOROLA MODELS
CTM4, A

TRADE NAME	Motorola Models CTM4, CTM4A (For 1954 Chevrolet Cars)
MANUFACTURER	Motorola Inc., 4545 Augusta Blvd., Chicago 51, Ill.
TYPE SET	Battery Operated Custom Built AM Superheterodyne Automobile Receiver
TUBES (Six)	Types: 6BD6 RF Amp., 6BE6 Conv., 6BD6 IF Amp., 6CR6 Det. -AVC-AF Amp., 6AQ5 Output, 6X4 Rectifier
POWER SUPPLY	6 Volt Storage Battery — RATING 5.6 Amp. @ 6.3 Volts DC
TUNING RANGE—BROADCAST	540KC-1605KC

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

Volume control should be at maximum position. Output of signal generator should be no higher than necessary to obtain an output reading. Use an insulated alignment screwdriver for adjusting.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	RADIO DIAL SETTING	OUTPUT METER	ADJUST	REMARKS
1.	.1MFD	High side to pin 7 (grid) of 6BE6 (V2). Low side to chassis.	455KC (400~ Mod.)	High freq. end of dial	Across Voice Coil	A1, A2, A3, A4	Adjust for maximum output.
2.	Fig. 1	Thru dummy to ant. receptacle	1605KC	"	"	A5	"
3.	"	"	1400KC	Tune to 1400KC signal	"	A6, A7	"
*4.	"	"	1605KC	Set cores approx. 1 1/32" from end of coil form. (Use tool in Fig. 2.)	"	A5, A6, A7	"
*5.	"	"	1400KC	Set tuner 29/64" from high freq. end stop.	"	A8, A9, A10	Adjust for maximum output. With receiver installed, antenna fully extended, tune to 1400KC or weak signal. Adjust for maximum volume.

*Tuner Alignment - Not necessary unless unit has been tampered with or if components have been changed.

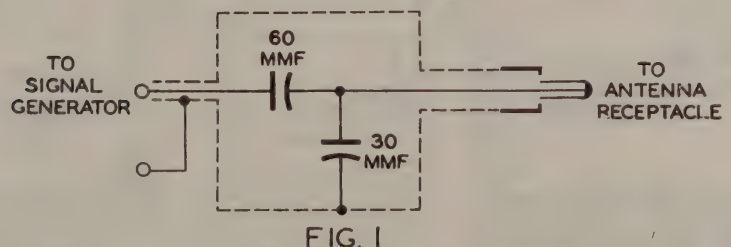


FIG. 1

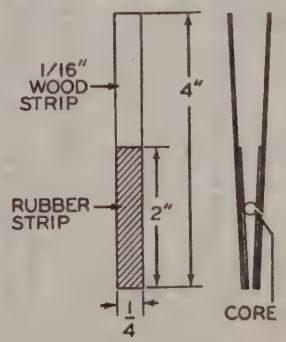


FIG. 2

HOWARD W. SAMS & CO., INC. • Indianapolis 5, Indiana

"The listing of any available replacement part herein does not constitute in any case a recommendation, warranty or guaranty by Howard W. Sams & Co., Inc., as to the quality and suitability of such replacement part. The numbers of these parts have been compiled from information furnished to Howard W. Sams & Co., Inc., by the manufacturers of the particular type of replacement part listed." "Reproduction or use, without express permission, of editorial or pictorial content, in any manner, is prohibited. No patent liability is assumed with respect to the use of the information contained herein. Copyright 1956 by Howard W. Sams & Co., Inc., Indianapolis 5, Indiana, U. S. of America. Copyright under international Copyright Union. All rights reserved under Inter-American Copyright Union (1910) by Howard W. Sams & Co., Inc." Printed in U. S. of America

PARTS LIST AND DESCRIPTIONS

MOTOROLA
Model CTM4

TUBES (SYLVANIA, GENERAL ELECTRIC, WESTINGHOUSE)

ITEM No.	USE	REPLACEMENT DATA		RETMA BASE TYPE	NOTES
		MOTOROLA PART No.	STANDARD REPLACEMENT		
V1	RF Amp.	6BD6	6BD6	7BK	
V2	Converter	6BE6	6BE6	7CH	
V3	IF Amp.	6BD6	6BD6	7BK	
V4	Det. -AVC-AF Amp.	6CR6	6CR6	7EA	
V5	Output	6AQ5	6AQ5	7BZ	
V6	Rect.	6X4	6X4	5BS	

ELECTROLYTIC CAPACITORS

ITEM No.	RATING		REPLACEMENT DATA				NOTES
	CAP.	VOLT.	MOTOROLA PART No.	MALLORY PART No.	PYRAMID PART No.	SANGAMO PART No.	
C1A	■15	350	23A485677	FP238	TM-3026	T-455	
B	▲10	350					
C	20	25					

FIXED CAPACITORS

Capacity values given in the rating column are in mfd. for Paper Capacitors, and in mmfd. Mica and Ceramic Capacitors.

ITEM No.	RATING		REPLACEMENT DATA				NOTES
	CAP.	VOLT.	MOTOROLA PART No.	CENTRALAB PART No.	ERIE PART No.	MALLORY PART No.	
C2	90		21A591682				
C3	.006	400	8R121001		GP3-333-602	PT626	
C4	5		21R115955	TCZ-4R7	NPOA-050	ZT-555	
C5	47		21R115593	TCN-47	N750K-470	NT-5447	
C6	.05	400	8R121567	DF-503		PT415	
C7	.05	200	8R121005	DF-503		PT415	
C8	10000		21R482726	DD-103	811-01	DC511	
C9	.002	600	8R121568	D6-202	GP2-333-202	PT622	
C10	.1	200	8R121573	DF-104		PT401	Note 1
C11	.02	400	8R121566	DF-203	817-02	PT412	
C12	.01	400	8R121002	D6-103	GP3-333-103	PT411	
C13	470		21R114554	DD-471	811-471	UC5347	
C14	.004	600	8R121000	D6-402	GP2-333-402	PT624	
C15	.03	1000	8R121572			PT1613	Note 2
C16	.5	100	8K17028			RF480	
C17	.5	100	8K17028			RF480	

Note 1. Model CTM4 uses a .05MFD unit in this application.
Note 2. Some versions may use a .02MFD unit in this application.

CONTROLS

ITEM No.	RATING		REPLACEMENT DATA					INSTALLATION NOTES
	RESISTANCE	WATTS	MOTOROLA PART No.	CENTRALAB PART No.	CLAROSTAT PART No.	IRC PART No.	MALLORY PART No.	
R1A	1Meg	½	18B531553	F1-55		QJ-721A♦		Tone (Panel)
B	250KΩ	½		R4-37				Volume (Rear) Tap at 125KΩ
C	Switch			KB-4				Attach to R1B.
R1A	250KΩ	½	18B531559			Q11-130		Volume (See Note 1)
B	Shaft		Not Req.			NQ		Attach to R1A.
C	Switch		Not Req.			76-1		Attach to R1A.

Note 1. Used in Model CTM4.
♦ Concentrikit Equivalent, K-6 Kit, Base Elements And Shafts, B11-137, P13-200 (Panel)
B13-130X, R1-212 (Rear)
76-1 (Switch)

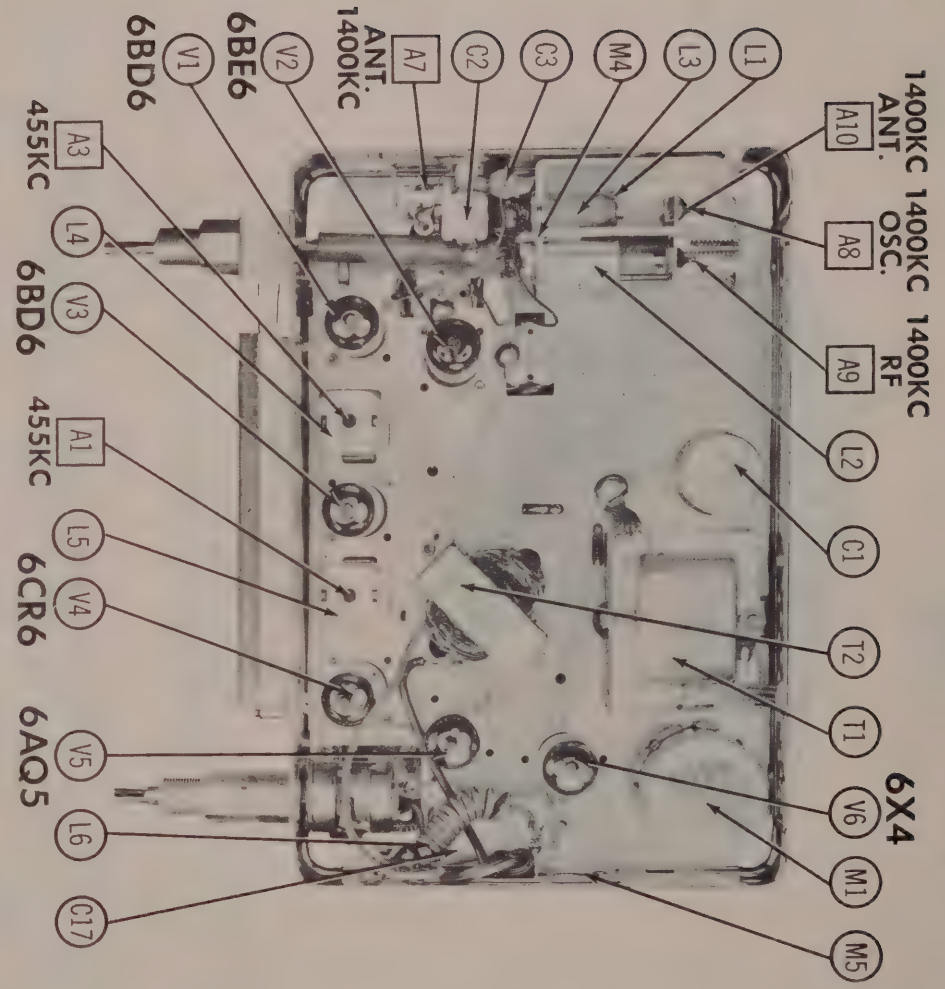
RESISTORS

ITEM No.	RATING		REPLACEMENT DATA		NOTES
	OHMS	WATT	MOTOROLA PART No.	IRC PART No.	
R2	1Meg	½	6R6004	BTS-1Meg	
R3	220Ω	½	6R6270	BTS-220	Note 1
R4	100KΩ	½	6R6075	BTS-100K	
R5	47KΩ	½	6R6056	BTS-47K	
R6	6800Ω	2	6R5690	BTB-6800	
R7	390Ω	½	6R5554	BTS-390	Note 2
R8	1Meg	½	6R6004	BTS-1Meg	
R9	2.2Meg	½	6R3927	BTS-2.2Meg	

ITEM No.	RATING		REPLACEMENT DATA		NOTES
	OHMS	WATT	MOTOROLA PART No.	IRC PART No.	
R10	1Meg	½	6R6004	BTS-1Meg	
R11	15KΩ	½	6R6119	BTS-15K	Note 3
R12	220KΩ	½	6R6015	BTS-220K	
R13	270KΩ	½	6R6414	BTS-270K	
R14	270Ω	½	6R6432	BTS-270	
R15	4.7Meg	½	6R2122	BTS-4.7Meg	Note 3
R16	2200Ω	2	6R476130	BTB-2200	
R17	56Ω	1	6R2037	BTA-56	
R18	56Ω	1	6R2037	BTA-56	

Note 1. Some versions use a 330Ω ½W resistor in this application.
Note 2. Some versions use a 180Ω ½W resistor or a 470Ω ½W resistor in this application.
Note 3. Not used in some versions.

CHASSIS—TOP VIEW



PARTS LIST AND DESCRIPTIONS (Continued)

TRANSFORMER (POWER)

ITEM No.	RATING				REPLACEMENT DATA					
	PRI.	SEC. 1	SEC. 2	SEC. 3	MOTOROLA PART No.	Halldorson PART No.	Merit PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.
T1	6.3VCT ②3A	460VCT .047ADC			25C501303-H	V-3801 ①	P-2970 ①	P-6478 ① ②		V-16K ①

① Drill new mounting holes.
② Enlarge cutout to clear windings.

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	IMPEDANCE		REPLACEMENT DATA						NOTES
	PRI.	SEC.	MOTOROLA PART No.	Halldorson PART No.	Merit PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.	
T2	5.2	3.3Ω	25B70171-P	Z1107	A-2930	A-3877	24S51	S-3X	

SPEAKER

ITEM No.	RATINGS			REPLACEMENT DATA		NOTES
	SIZE	FIELD	V. C. IMP.	MOTOROLA PART No.	QUAM PART No.	
SP1	6"x 9"	PM	3.3Ω	50C513197 50C513193 50C513195 ① 50C513200 50C513544	69A3	① Alternate 6"x 9" PM speakers.

COILS (RF-IF)

ITEM No.	USE	DC RES.		REPLACEMENT DATA				NOTES
		PRI.	SEC.	MOTOROLA PART No.	MEISSNER PART No.	MERIT PART No.	MILLER PART No.	
L1	Ant. Coil	12Ω		24B502472				
L2	RF Coil	12Ω		24B502473				
L3	Osc. Coil	.8Ω	2.9Ω	24B502474				
L4	Input IF	17Ω	17Ω	24C485553	16-6758	BC-352	12-C1	
L5	Output IF	18Ω	18Ω	24K485554	16-6770	BC-355	12-C6	
L6	Fil. Choke	0Ω		24K580706				
L7	Vib. Hash Choke	0Ω		24A472535				

VIBRATOR

ITEM No.	TYPE	INPUT VOLTS	FRE-QUENCY	REPLACEMENT DATA				NOTES
				MOTOROLA PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	RADIART PART No.	
M1	Interruptor	6.3V	115v	48B3333	5342	903M	5342	

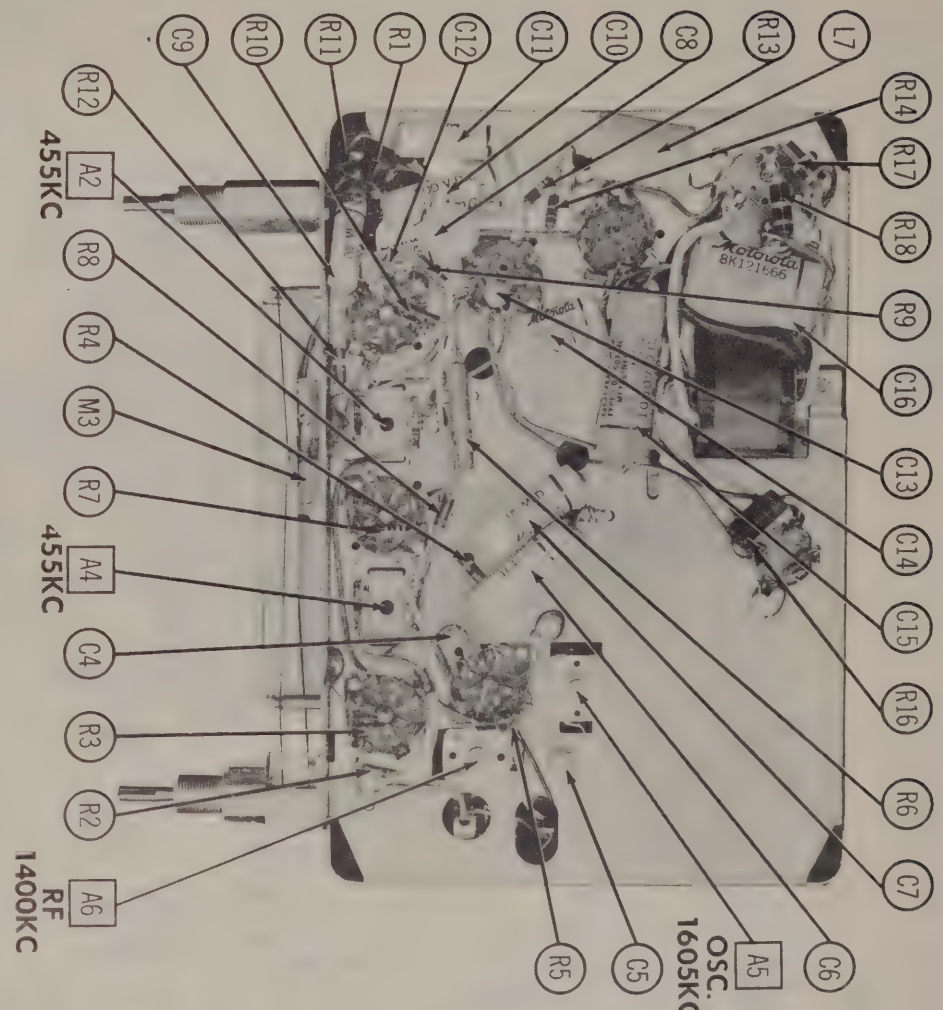
FUSES

ITEM No.	TYPE	RATING	REPLACEMENT DATA					
			MOTOROLA PART No.		LITTELFUSE PART No.		BUSS PART No.	
			FUSE	HOLDER	FUSE	HOLDER	FUSE	HOLDER
M2	SFE	9A	65K16248	9K530099	307009 (SFE9A)	155009	SFE9	HRH

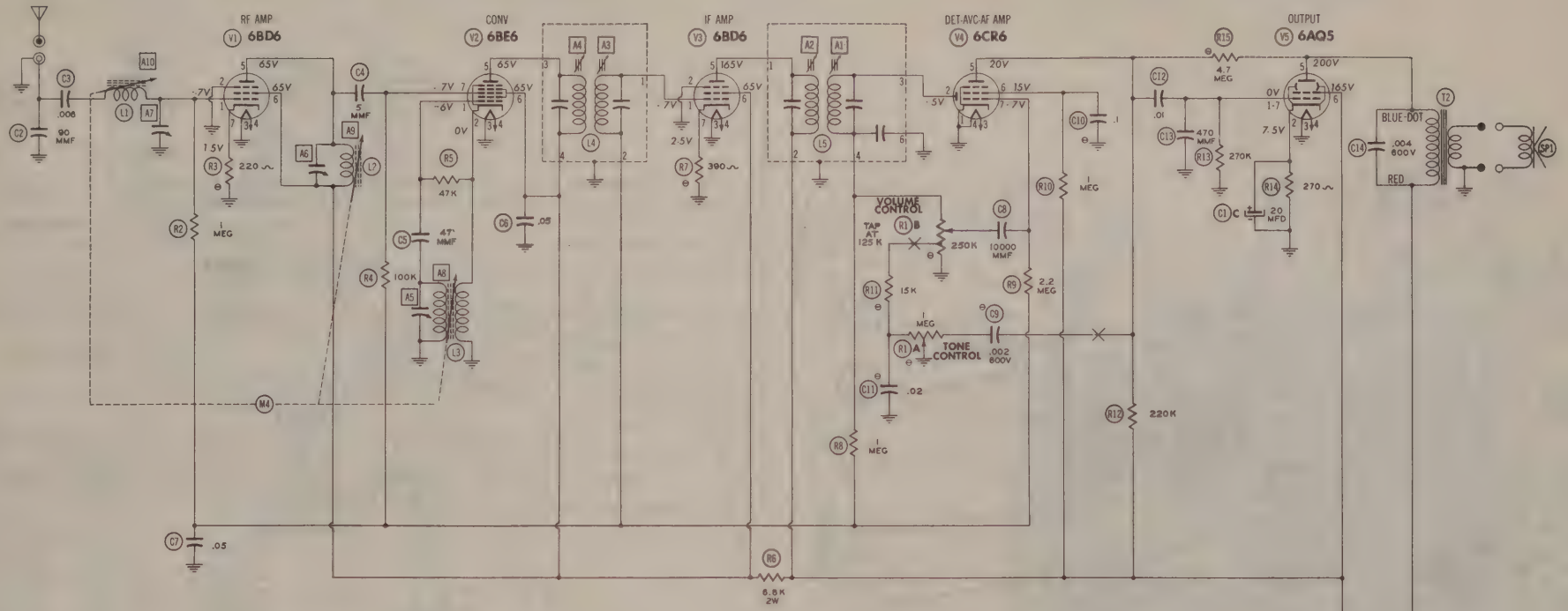
MISCELLANEOUS

ITEM No.	PART NAME	MOTOROLA PART No.	NOTES
M3	Dial Light	65X10867	#44
M4	Tuner	510502490	Permeability-Complete; Includes L1, L2, L3. Not used in all versions.
	Tuner	77D532163	Permeability-Complete; Includes L1, L2, L3. Used in some versions.
M5	Spark Plate		
A5	Trimmer Cap.	20A485708	Osc. Trimmer (395-470MMF)
A6	Trimmer Cap.	20A481526	RF Trimmer (20-180MMF)
A7	Trimmer Cap.	20A502338	Ant. Trimmer (50-280MMF)
	Knob	1V530175	On-Off-Volume & Tuning
	Knob	36B530118	Dummy
	Knob	36K530119	Tone-Model CTM4A only.
	Dial Scale	34B530121	
	Dial Pointer & Slider Assy.	52A530111	

CHASSIS—BOTTOM VIEW



MOTOROLA Model CTM4



IF=455KC

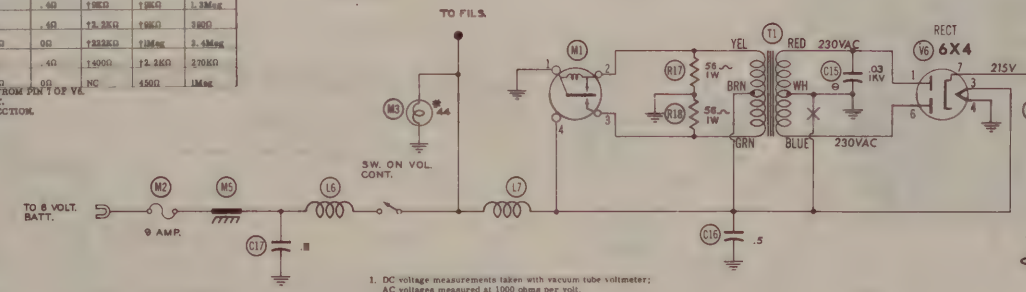
THE COOPERATION OF THE MANUFACTURER OF THIS RECEIVER MAKES IT POSSIBLE TO BRING YOU THIS SERVICE

⊖ SEE PARTS LIST FOR ALTERNATE VALUE OR APPLICATION

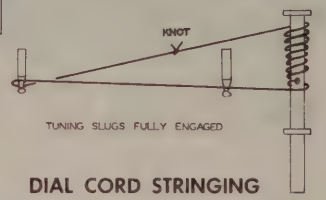
RESISTANCE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7
V 1	6BD6	2.2Meg	0Ω	0Ω	.4Ω	†9KΩ	†9KΩ	330Ω
V 2	6BE6	47KΩ	.7Ω	0Ω	.4Ω	†9KΩ	†9KΩ	1.2Meg
V 3	6BD6	1.2Meg	0Ω	0Ω	.4Ω	†2.2KΩ	†9KΩ	330Ω
V 4	6CR6	0Ω	330KΩ	.4Ω	0Ω	†232KΩ	†1Meg	2.4Meg
V 5	6AQ5	270KΩ	270Ω	0Ω	.4Ω	†400Ω	†2.2KΩ	270KΩ
V 6	6X4	450Ω	T.P.	.4Ω	0Ω	NC	450Ω	1Meg

†MEASURED FROM PIN 1 OF V6.
T.P.-TIE POINT.
NC-NO CONNECTION.



1. DC voltage measurements taken with vacuum tube voltmeter; AC voltages measured at 1000 ohms per volt.
2. Socket connections are shown as bottom views.
3. Measured values are from socket pin to common negative.
4. Battery voltage maintained at 6.3 volts for voltage readings.
5. Nominal tolerance on components values makes possible a variation of ± 10% in voltage and resistance readings.
6. Volume control at maximum, no signal applied for voltage measurements.



DIAL CORD STRINGING

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MOTOROLA MODELS 65L1, 65L2 (Ch. HS-455)

MOTOROLA MODELS 65L1, 65L2 (Ch. HS-455)

TRADE NAME	Motorola Models 65L1, 65L2 (Ch. HS-455)
MANUFACTURER	Motorola, Inc., 4545 Augusta Blvd., Chicago 51, Ill.
TYPE SET	Three Power Portable AM Superheterodyne Receiver
TUBES (Five)	Types: 1U4 RF Amp., 1R5 Conv., 1U4 IF Amp., 1U5 Det.-AVC-AF Amp., 3V4 Output
POWER SUPPLY RATINGS	110-120 volts AC-DC (or) 9 Volts "A" Supply & 90 Volts "B" Supply In Pack Form .1 Amp. @ 117 Volts AC (or) 50MA @ 9 Volts DC & 11MA @ 90 Volts DC
TUNING RANGE—BROADCAST	535KC-1620KC

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

Volume control should be at maximum position. Output of signal generator should be no higher than necessary to obtain an output reading. Use an insulated alignment screwdriver for adjusting.
Use battery power, if possible . If AC power is used, use an isolation transformer when available. If not, connect a .1MFD capacitor in series with low side of signal generator and B-.
To set pointer, turn tuning capacitor fully closed and set pointer parallel with base of dial.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	RADIO DIAL SETTING	OUTPUT METER	ADJUST	REMARKS
1.	.1MFD	High side to pin 6 (grid) of 1R5 (V2). Low side to B-.	455KC (400~Mod)	Tuning gang fully open	Across voice coil	A1, A2, A3, A4	Adjust for maximum output.
2.	"	"	1620KC	"	"	A5	"
3.		Loop	1400KC	Tune to 1400KC signal	"	A6, A7	Fashion loop of several turns of wire and radiate signal into loop of receiver. Adjust for maximum output.
4.		"	600KC	Tune to 600KC signal	"	A8	Adjust for maximum signal while rocking tuning gang. Repeat steps 2, 3 and 4.

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PARTS LIST AND DESCRIPTIONS

MOTOROLA
Model 65L1 (Ch. HS-455)

TUBES (SYLVANIA, GENERAL ELECTRIC, WESTINGHOUSE)

ITEM No.	USE	REPLACEMENT DATA: MOTOROLA PART No.	REPLACEMENT DATA: STANDARD REPLACEMENT	RETMA BASE TYPE	NOTES
V1	RF Amplifier	1U4	1U4	6AR	
V2	Converter	1R5	1R5	7AT	
V3	IF Amplifier	1U4	1U4	6AR	
V4	Det.-AVC-AF Amp.	1U5	1U5	6BW	
V5	Audio Output	3V4	3V4	6BX	

ELECTROLYTIC CAPACITORS

ITEM No.	RATING: CAP.	RATING: VOLT.	REPLACEMENT DATA: MOTOROLA PART No.	REPLACEMENT DATA: MALLORY PART No.	REPLACEMENT DATA: PYRAMID PART No.	REPLACEMENT DATA: SANGAMO PART No.	NOTES
C1A	▲100	150	23B611598	FP302.8	TM-3134	Q-005	
B	■80	150			TD-50-150	MTH-1225	
C	▲200	10					

FIXED CAPACITORS

Capacity values given in the rating column are in mfd. for Paper Capacitors, and in mmfd. Mica and Ceramic Capacitors.

ITEM No.	RATING: CAP.	RATING: VOLT.	REPLACEMENT DATA: MOTOROLA PART No.	REPLACEMENT DATA: CENTRALAB PART No.	REPLACEMENT DATA: ERIE PART No.	REPLACEMENT DATA: MALLORY PART No.	NOTES
C2	.05	200	8R121005	DF-503		PT415	
C3	100		21R120577	TCN-100	N750L-101	NT-531	
C4	10000		21R482726	DD-103	811-01	DC-511	
C5	100		21R120577	TCN-100	N750L-101	NT-531	
C6	.05	200	8R121005	DF-503		PT415	
C7	10		21R115884	D6-100	831-100	ZT-541	
C8	10000		21R482726	DD-103	811-01	DC-511	
C9	10000		21R482726	DD-103	811-01	DC-511	
C10A	150				811-151	UC-5315	
B	2000				801-002	DC-522	
C	150		♦21R621535	♦PC-165	811-151	UC-5315	
D	10000				811-01	DC-511	
E	5000				811-005	DC-525	
C11	.002	600		D6-202	GP2-333-202	PT622	Note 1
C12	.047	400	8K490232	DF-503		PT4147	
C13	.02	200	8R121003	DF-203		PT412	
C14	.05	200	8R121005	DF-503		PT415	
C15	.1	200	8K490210	DF-104		PT401	

♦ Items C10A, C10B, C10C, C10D, C10E, R12A, R12B, R12C and R12D are combined in one unit.
Note 1. Some versions may use a .01MFD unit in this application (part #21R121946).

CONTROLS

ITEM No.	RATING: RESISTANCE	RATING: WATTS	REPLACEMENT DATA: MOTOROLA PART No.	REPLACEMENT DATA: CENTRALAB PART No.	REPLACEMENT DATA: CLAROSTAT PART No.	REPLACEMENT DATA: IRC PART No.	REPLACEMENT DATA: MALLORY PART No.	INSTALLATION NOTES
R1A	1Meg	½	18A632957	AB-70	A47-1Meg-Z	Q13-137	U-53	Volume
B	Shaft		Not Req.	AK-4	KSS-3	Not Req.	Not Req.	Attach to R1A
C	Switch		Not Req.	KB-2	SWE-20	76-2	US-27	Attach to R1A

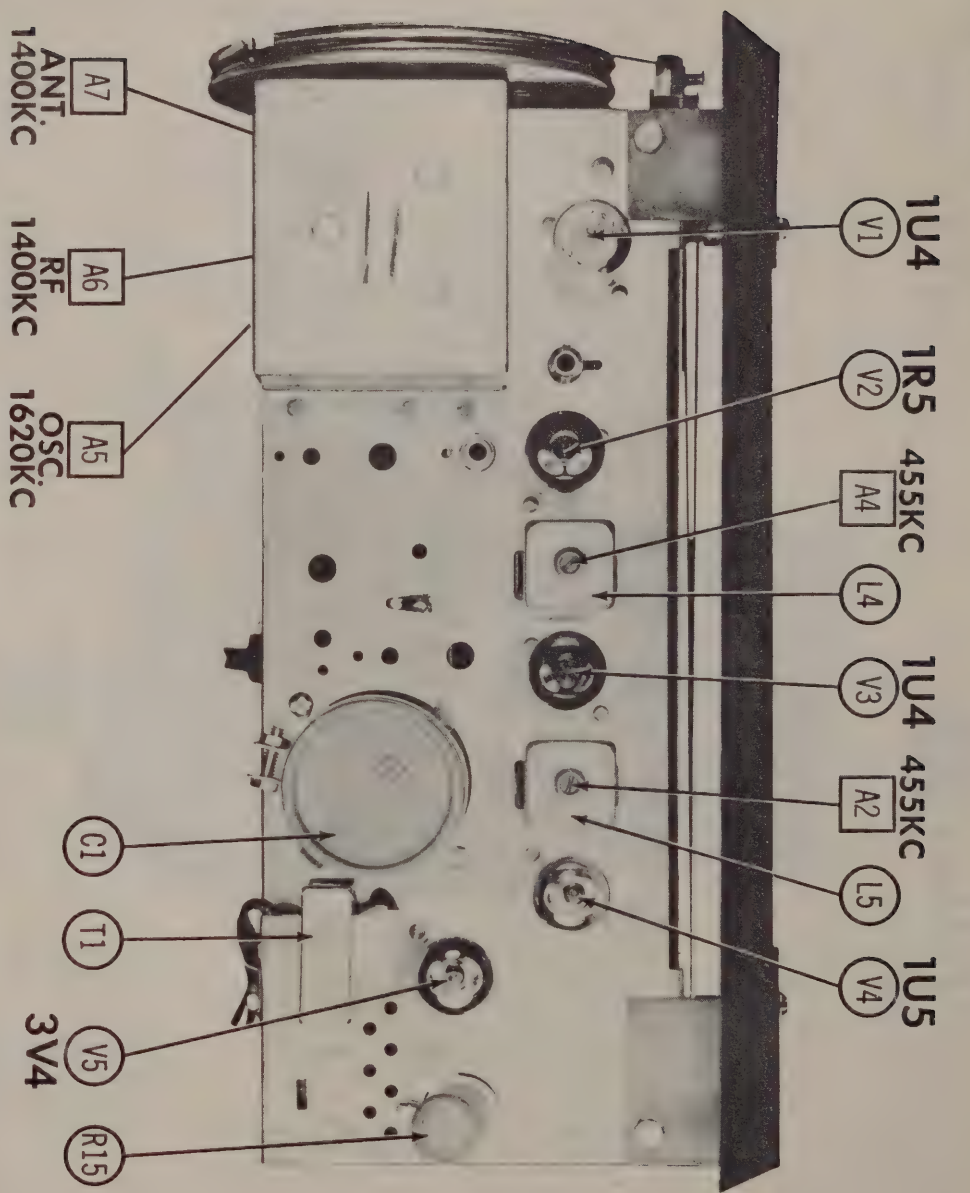
RESISTORS

ITEM No.	RATING: OHMS	RATING: WATT	REPLACEMENT DATA: MOTOROLA PART No.	REPLACEMENT DATA: IRC PART No.	NOTES
R2	2.2Meg	½	6R3927	BTS-2.2Meg	
R3	5.6Meg	½	6R3988	BTS-5.6Meg	
R4	220KΩ	½	6R6015	BTS-220K	
R5	1Meg	½	6R6004	BTS-1Meg	
R6	100KΩ	½	6R6031	BTS-100K	
R7	27KΩ	½	6R6434	BTS-27K	
R8	10Meg	½	6R2109	BTS-10Meg	
R9	1Meg	½	6R6004	BTS-1Meg	
R10	2.2Meg	½	6R3927	BTS-2.2Meg	

ITEM No.	RATING: OHMS	RATING: WATT	REPLACEMENT DATA: MOTOROLA PART No.	REPLACEMENT DATA: IRC PART No.	NOTES
R11	1Meg	½	6R6004	BTS-1Meg	
R12A	10Meg	½		BTS-10Meg	
B	4.7Meg	½	♦21R621535	BTS-4.7Meg	
C	1Meg	½		BTS-1Meg	
D	3.3Meg	½		BTS-3.3Meg	
R13	220Ω	½	6R6270	BTS-220	
R14	1000Ω	½	6R6229	BTS-1000	
R15	2000Ω	10	17B611589	PW10-2000	
R16	820Ω	½	6R6269	BTS-820	
R17	150Ω	2	17A76986	PW4-150	

♦ Items C10A, C10B, C10C, C10D, C10E, R12A, R12B, R12C, R12D are combined in one unit.

CHASSIS—TOP VIEW



PARTS LIST AND DESCRIPTIONS (Continued)

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	IMPEDANCE PRI.	IMPEDANCE SEC.	REPLACEMENT DATA: MOTOROLA PART No.	Halldorson PART No.	Merit PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.	NOTES
T1	9.2KΩ	3.5Ω	25K632958D		A-2927 ①	A-3329 ①	24S49 ①	S-11X ①	① Bend mounting tabs down, file out slots. Mount on orig. mounting bracket.

SPEAKER

ITEM No.	RATINGS SIZE	FIELD	V. C. IMP.	REPLACEMENT DATA: MOTOROLA PART No.	QUAM PART No.	NOTES
SP1	6"	PM	3.5Ω	50B633459	6A1	

COILS (RF-IF)

ITEM No.	USE	DC RES. PRI.	DC RES. SEC.	REPLACEMENT DATA: MOTOROLA PART No.	MEISSNER PART No.	MERIT PART No.	MILLER PART No.	NOTES
L1	Loop Ant.	3Ω		24C633021				
L2	RF Coil	6.5Ω	10Ω *	24B611539				* Tapped @4.8Ω
L3	Osc. Coil	3.5Ω	10Ω	24B621561	14-1074	BC-387	71-OSC	
L4	Input IF	32Ω	32Ω	24K600824	16-6758	BC-352	12-C1	
L5	Output IF	32Ω	32Ω	24K600824	16-6758	BC-353	12-C2	

SELENIUM RECTIFIER

ITEM No.	RATING CURRENT	REPLACEMENT DATA: MOTOROLA PART No.	FEDERAL PART No.	INTERNATIONAL PART No.	MALLORY PART No.	RADIO RECEPTOR PART No.	SARKES TARZIAN PART No.	NOTES
M1	.062ADC	48K692077	1003A	RSO-65	6S75	5M4	75	

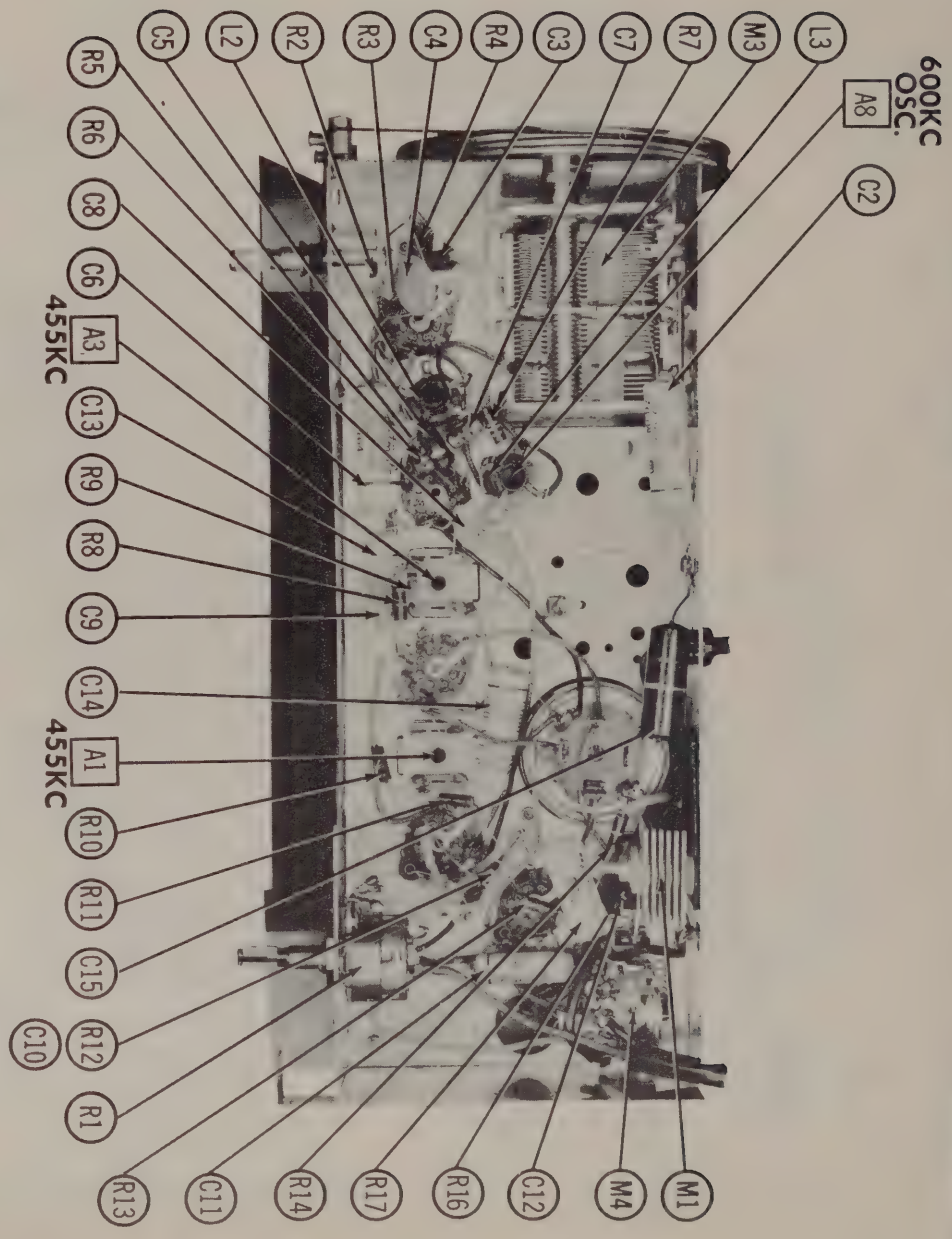
BATTERIES

ITEM No.	VOLTAGE	MOTOROLA PART No.	REPLACEMENT DATA: EVEREADY "A"	EVEREADY "B"	EVEREADY "A-B"	BURGESS "A"	BURGESS "B"	BURGESS "A-B"	INSTALLATION NOTES
M2	9V"A" 90V"B"				756			T6Z60	

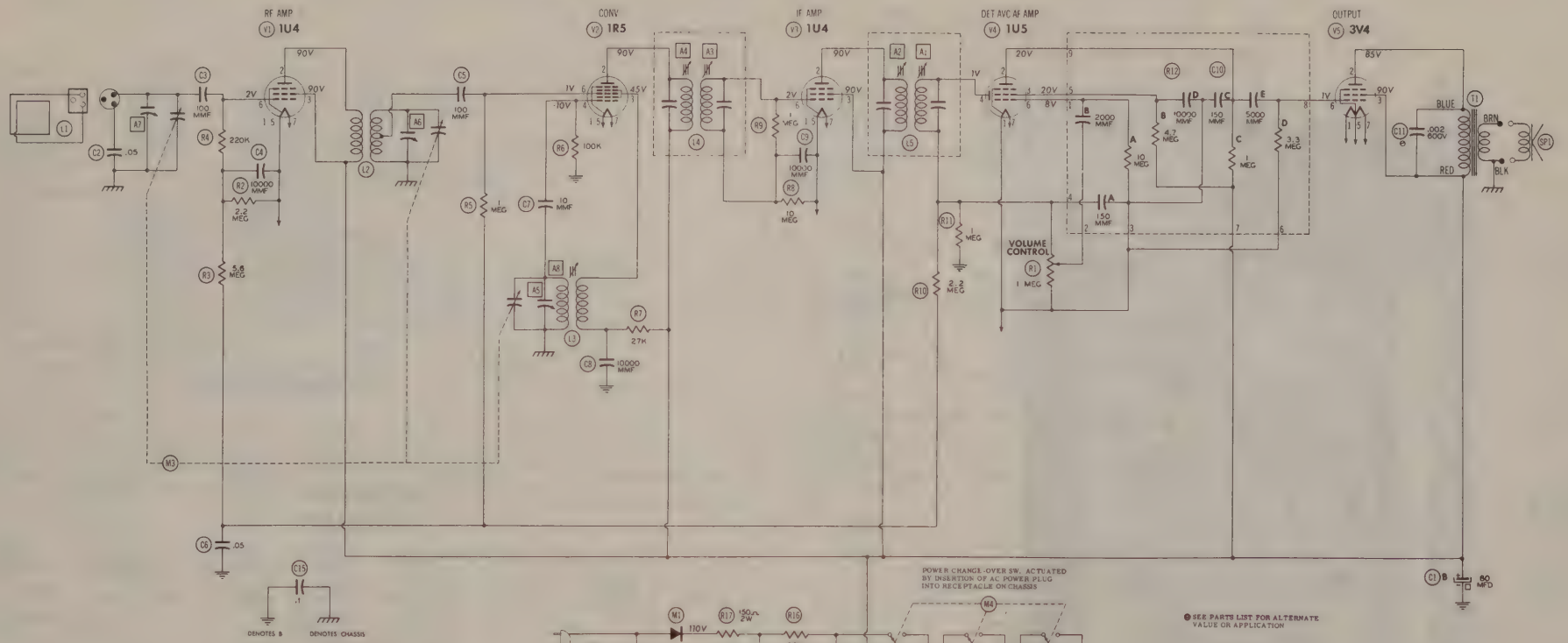
MISCELLANEOUS

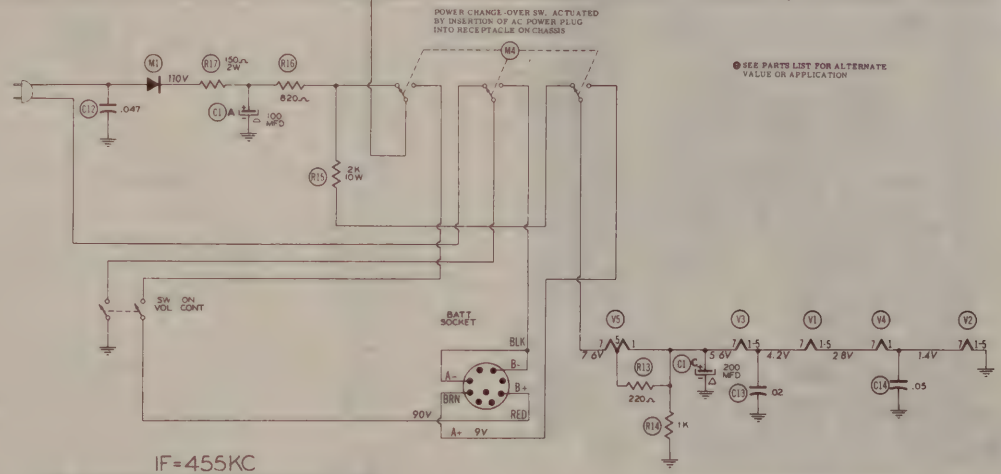
ITEM No.	PART NAME	MOTOROLA PART No.	NOTES
M3	Tuning Cap.	19K631661	3 Gang (14-395MMF, 17-210MMF, 13-105MMF)
M4	Switch	40B611599	Power Changeover (3 Pole - 2 Position)
	Cabinet	16E633085	Less Dial scale, loop ant., loop ant. cover - Model 65L1
	Cabinet	16K633086	Less Dial scale, loop ant., loop ant. cover - Model 65L2
	Cover	15C632984	Loop Ant. - Model 65L1
	Cover	15K633059	Loop Ant. - Model 65L2
	Handle	55K633087	Model 65L1
	Handle	55K633088	Model 65L2
	Front Cover and Hinge Assy.	15K633124	Less loop ant., loop ant. cover - Model 65L1
	Front Cover and Hinge Assy.	15K633125	Less loop ant., loop ant. cover - Model 65L2
	Rear Cover Assy.	15K633126	Model 65L1
	Rear Cover Assy.	15K633127	Model 65L2
	Knob	36B633044	On-off-volume & tuning - Model 65L1
	Knob	36K633045	On-off-volume & tuning - Model 65L2
	Dial Scale	34D633054	

CHASSIS—BOTTOM VIEW



MOTOROLA Model 65L1 (Ch. HS-455)





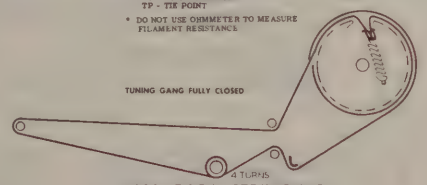
SEE PARTS LIST FOR ALTERNATE VALUE OR APPLICATION

RESISTANCE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7
V 1	1U4	*	†1KΩ	†1KΩ	TP	*	2.4Meg	*
* 2	1R5	0Ω	†1KΩ	†28KΩ	100KΩ	-	3Meg	*
V 3	1U4	*	†1KΩ	†1KΩ	TP	*	1Meg	*
V 4	1U5	*	†1Meg	†4.7Meg	500KΩ	NC	10Meg	*
* 5	3V4	*	†1.8KΩ	†1KΩ	NC	*	3.3Meg	*

† MEASURED FROM OUTPUT OF M1.
NC - NO CONNECTION
TP - TIE POINT

* DO NOT USE OHMMETER TO MEASURE FILAMENT RESISTANCE.



DIAL CORD STRINGING

IF=455KC

THE COOPERATION OF THE MANUFACTURER OF THIS RECEIVER MAKES IT POSSIBLE TO BRING YOU THIS SERVICE

1. DC voltage measurements taken with vacuum tube voltmeter, AC voltages measured at 1000 ohms per volt.
2. Socket connections are shown as bottom views.
3. Measured values are from socket pin to common negative.
4. Line voltage maintained at 117 volts for voltage readings.
5. Nominal tolerance on component values makes possible a variation of ± 15% in voltage and resistance readings.
6. Volume control at maximum, no signal applied for voltage measurements.

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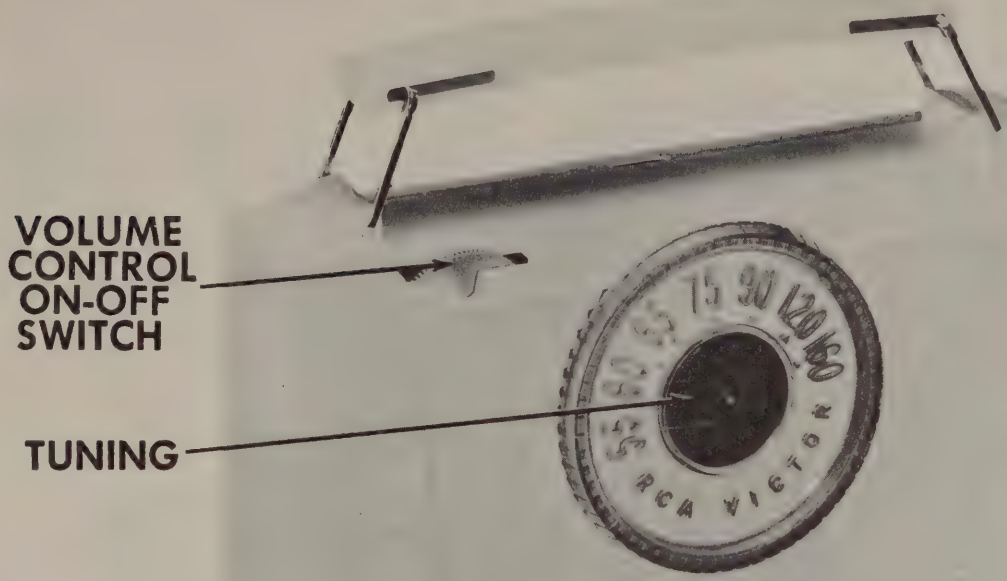
RCA VICTOR MODELS 6-B-4A, B, 6-B-5 (Ch. RC1098B)



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RCA VICTOR MODELS 6-B-4A, B, 6-B-5 (Ch. RC1098B)

TRADE NAME	RCA Victor Models 6-B-4A, 6-B-4B, 6-B-5 (Ch. RC1098B)
MANUFACTURER	RCA Victor, Radio & "Victrola" Div., Radio Corp. of America, Camden 2, N. J.
TYPE SET	Battery Operated Portable AM Superheterodyne Receiver
TUBES (Four)	Types: 1R5 Conv., 1U4 IF Amp., 1U5 Det.-AVC-AF Amp., 3V4 Output
POWER SUPPLY	1.5 Volts "A" Supply & 67.5 Volts "B" Supply
RATING	240MA @ 1.5 Volts DC & 9MA @ 67.5 Volts DC
TUNING RANGE--BROADCAST	540KC-1600KC

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

Volume control should be at maximum position. Output of signal generator should be no higher than necessary to obtain an output reading. Use an insulated alignment screwdriver for adjusting.
Loop should be maintained in same relative position to chassis as when receiver is in cabinet.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	RADIO DIAL SETTING	OUTPUT METER	ADJUST	REMARKS
1.	.01MFD	High side to antenna lug on tuning gang. Low side to chassis.	455KC (400~ Mod.)	Point of non-interference near 1600KC	Across Voice Coil	*A1, A2, A3, A4	Adjust for maximum output.
2.		Loop	1620KC	Tuning gang fully open	"	A5	Fashion loop of several turns of wire and radiate signal into loop of receiver. Adjust for maximum output.
3.		"	1400KC	Tune to 1400KC signal	"	A6	"
4.		"	600KC	Tune to 600KC signal	"	A7	Adjust for maximum output while rocking tuning gang thru 600KC.

* Both Pri. & Sec. slugs adjustable from top.

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PARTS LIST AND DESCRIPTIONS

RCA VICTOR
Model 6-B-4B

TUBES (SYLVANIA, GENERAL ELECTRIC, WESTINGHOUSE)

ITEM No.	USE	REPLACEMENT DATA		RETMA BASE TYPE	NOTES
		RCA Victor PART No.	STANDARD REPLACEMENT		
V1	Conv.	1R5	1R5	7AT	
V2	IF Amp.	1U4	1U4	6AR	
V3	Det. -AVC-AF Amp	1U5	1U5	6BW	
V4	Audio Output	3V4	3V4	6BX	

ELECTROLYTIC CAPACITORS

ITEM No.	RATING		REPLACEMENT DATA				NOTES
	CAP.	VOLT.	RCA Victor PART No.	MALLORY PART No.	PYRAMID PART No.	SANGAMO PART No.	
C1	10	70	73964	TC-42	TD-10-150	FM-1512	

FIXED CAPACITORS

Capacity values given in the rating column are in mfd. for Paper Capacitors, and in mmfd. Mica and Ceramic Capacitors.

ITEM No.	RATING		REPLACEMENT DATA				NOTES
	CAP.	VOLT.	RCA Victor PART No.	CENTRALAB PART No.	ERIE PART No.	MALLORY PART No.	
C2	.047	200	73558	DF-503		PT4147	
C3	56		100085	TCZ-56	NPO-337-560		
C4	10000		73960	DD-103	811-01	DC511	
C5	.003	200	73961				
C6	4		73153				
C7	82		75787	D6-820	GP1K-820		
C8A	68		♦79767	D6-680	GP1K-680	UC-5468	
B	1000			D6-102	GP2L-102	UC-521	
C	68			D6-680	GP1K-680	UC-5468	
D	5000			D6-502	GP2-333-502	UC-525	
E	2500			D6-252	GP2-333-252	UC-5225	
C9	.0018	200	100241				

♦ Items C8A, C8B, C8C, C8D, C8E, R7A, R7B, R7C, and R7D are combined in one unit.

CONTROLS

ITEM No.	RATING		REPLACEMENT DATA					INSTALLATION NOTES
	RESISTANCE	WATTS	RCA Victor PART No.	CENTRALAB PART No.	CLAROSTAT PART No.	IRC PART No.	MALLORY PART No.	
R1	2Meg	½	75773					Volume and Switch

RESISTORS

ITEM No.	RATING		REPLACEMENT DATA		NOTES
	OHMS	WATT	RCA Victor PART No.	IRC PART No.	
R2	100KΩ	½	502410	BTS-100K	
R3	3.3Meg	½	502533	BTS-3.3Meg	
R4	15KΩ	½	502315	BTS-15K	
R5	4.7Meg	½	502547	BTS-4.7Meg	
R6	47KΩ	½	502347	BTS-47K	

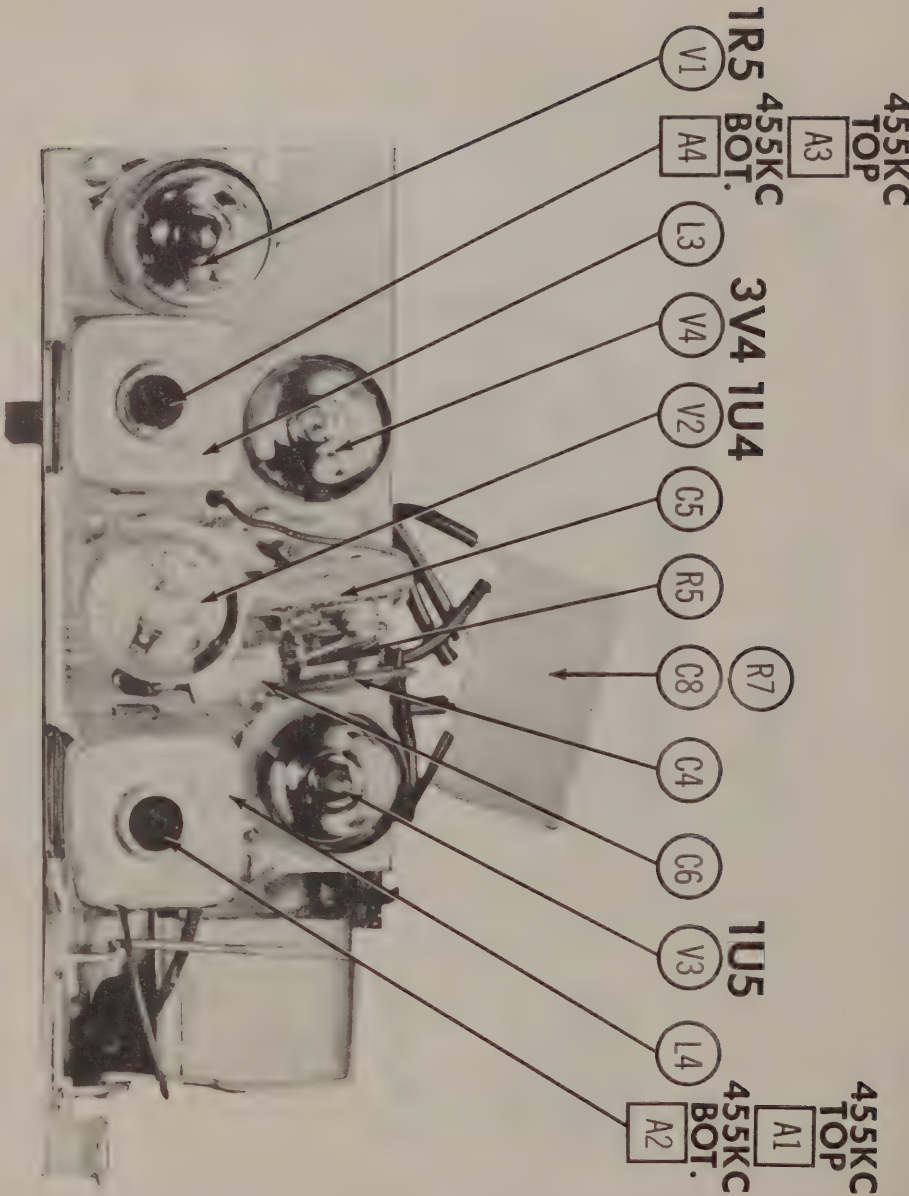
ITEM No.	RATING		REPLACEMENT DATA		NOTES
	OHMS	WATT	RCA Victor PART No.	IRC PART No.	
R7A	10Meg	½	♦79767	BTS-10Meg	
B	4.7Meg	½		BTS-4.7Meg	
C	1Meg	½		BTS-1Meg	
D	3.3Meg	½		BTS-3.3Meg	
R8	390Ω	½	502139	BTS-390	

♦ Items C8A, C8B, C8C, C8D, C8E, R7A, R7B, R7C, R7D are combined in one unit.

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	IMPEDANCE		REPLACEMENT DATA						NOTES
	PRI.	SEC.	RCA Victor PART No.	Halldorson PART No.	Merit PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.	
T1	9.8KΩ	10.4Ω	100243						

CHASSIS—TOP VIEW



PARTS LIST AND DESCRIPTIONS (Continued)

SPEAKER

ITEM No.	RATINGS			REPLACEMENT DATA		NOTES
	SIZE	FIELD	V. C. IMP.	RCA Victor PART No.	QUAM PART No.	
SP1	2"x 3"	PM	10. 4Ω	76373		

COILS (RF-IF)

ITEM No.	USE	DC RES.		REPLACEMENT DATA				NOTES
		PRI.	SEC.	RCA Victor PART No.	MEISSNER PART No.	MERIT PART No.	MILLER PART No.	
L1	Ant. Coil	1. 7Ω		75778				
L2	Osc. Coil	1Ω	6. 5Ω	75774	14-1074	BC-387	70-Osc.	
L3	Input IF	25Ω	25Ω	100245	16-6758	BC-352	12-C1	
L4	Output IF	24Ω	24Ω	100246	16-6758	BC-353	12-C2	

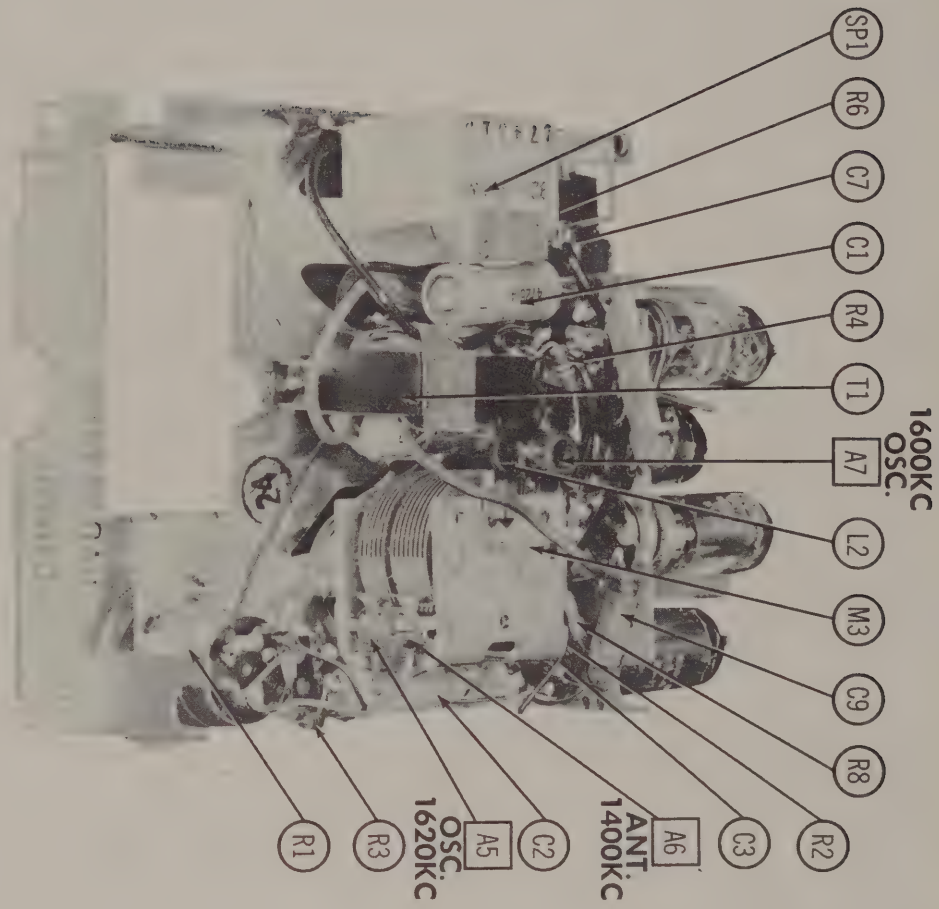
BATTERIES

ITEM No.	VOLTAGE	RCA Victor PART No.	REPLACEMENT DATA						INSTALLATION NOTES
			EVEREADY			BURGESS			
			"A"	"B"	"A-B"	"A"	"B"	"A-B"	
M1	1. 5V "A"	VS036	950			2R			
M2	67. 5V "B"	VS016		467			XX45		

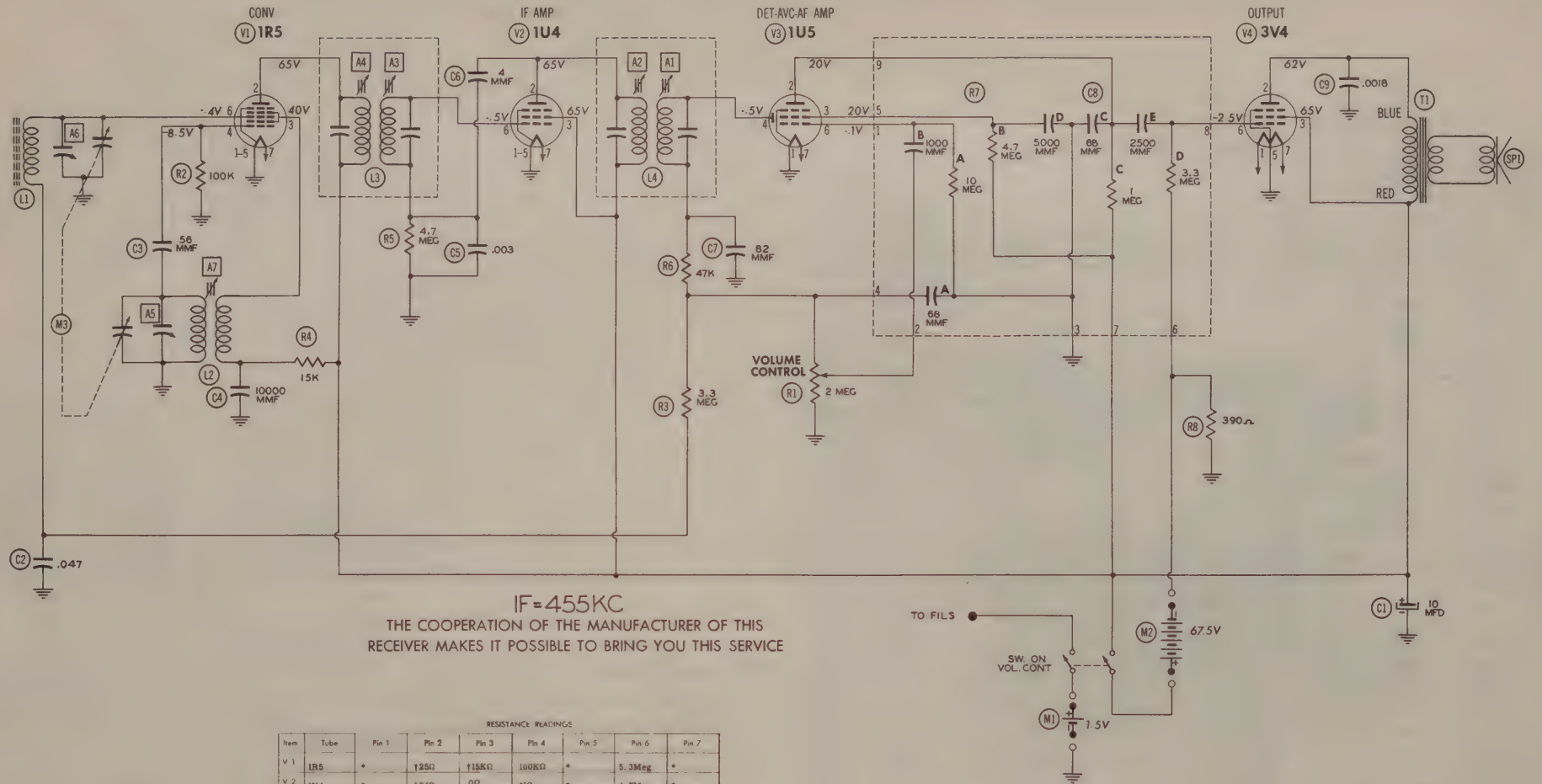
MISCELLANEOUS

ITEM No.	PART NAME	RCA Victor PART No.	NOTES
M3	Tuning Cap.	100242	2 Gang (10-215MMF, 14-112MMF)
	Case	Y2758	Less handle-Model 6-B-4A
	Case	Y2760	Less handle-Model 6-B-4B
	Case	Y2759	Less handle-Model 6-B-5
	Handle	100238	Model 6-B-4A
	Handle	100240	Model 6-B-4B
	Handle	100239	Model 6-B-5
	Knob	100216	Tuning

CHASSIS—BOTTOM VIEW



RCA VICTOR Model 6-B-4A



IF=455KC

THE COOPERATION OF THE MANUFACTURER OF THIS RECEIVER MAKES IT POSSIBLE TO BRING YOU THIS SERVICE

RESISTANCE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7
V 1	1R5	*	†25Ω	†15KΩ	100KΩ	*	5.3Meg	*
V 2	1U4	*	†24Ω	0Ω	NC	*	4.7Meg	*
V 3	1U5	*	†1Meg	†4.7Meg	2Meg	NC	10Meg	*
V 4	3V4	*	†376Ω	90KΩ	TP	*	3.3Meg	*

*DO NOT USE OHMMETER TO MEASURE FILAMENT RESISTANCE.
†MEASURED FROM POSITIVE SIDE OF C1.
TP-TIE POINT.
NC-NO CONNECTION.

1. DC voltage measurements taken with vacuum tube voltmeter; AC voltages measured at 1000 ohms per volt.
2. Socket connections are shown as bottom views.
3. Measured values are from socket pin to common negative.
4. Nominal tolerance on component values makes possible a variation of ± 15% in voltage and resistance readings.
5. Volume control at maximum, no signal applied for voltage measurements.

A PHOTOFACT STANDARD NOTATION SCHEMATIC

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PHOTOFACT® Folder

RAYTHEON MODELS C-2169B, M, C-2174, UC-2169B, M, UC-2184 (Ch. 21T254AGH, AS)

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RAYTHEON MODEL UC-2169M

TRADE NAME	RAYTHEON MODELS	CHASSIS
	C-2169B, C-2169M, C-2174	21T254AS
	UC-2169B, UC-2169M, UC-2184	21T254AGH
MANUFACTURER	Raytheon Manufacturing Co., Television & Radio Division, 5921 W. Dickens Ave., Chicago 39, Ill.	
TYPE SET	Television Receiver	
TUBES	Seventeen	
POWER SUPPLY	105-115 Volts AC-60 Cycle	RATING 1.52 Amp. @ 115 Volts AC
TUNING RANGE-	Channels 2 thru 13 VHF, 14 thru 83 UHF, Video IF 45.75MC, Sound IF 41.25MC (Intercarrier)	

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RAYTHEON MODELS C-2169B, M, C-2174, UC-2169B, M, UC-2184 (Ch. 21T254AGH, AS)

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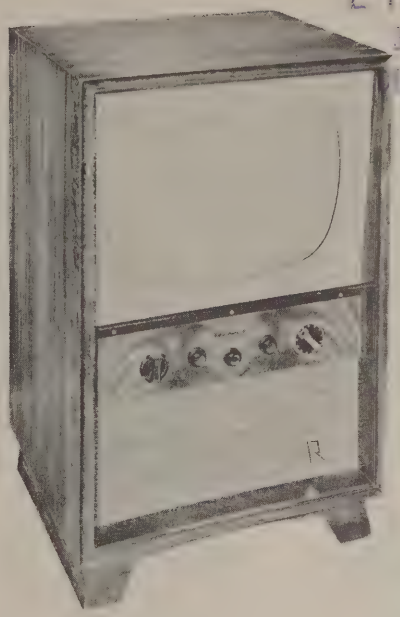

DISASSEMBLY INSTRUCTIONS

CHASSIS REMOVAL

1. Remove 9 push-on type control knobs from front panel of cabinet.
2. Remove 9 wood screws and 1 metal screw. Remove rear cover.
3. Remove 2 wood screws. Remove antenna and interlock bracket.
4. Disconnect speaker leads, H. V. lead, yoke leads, and picture tube socket.
5. Remove 5 chassis bolts and 2 bolts that mount chassis to inside of front panel (available under chassis to the center front). Remove chassis.
6. Remove 6 speaker nuts. Remove 3 speakers.

MODEL	CHASSIS
C-2169B, C-2169M, C-2174	21T254AS
UC-2169B, UC-2169M, UC-2184	21T254AGH

SERVICING IN THE FIELD

TUNER OSCILLATOR ADJUSTMENTS

Touch-up adjustments of the VHF Tuner Oscillator Circuit may be accomplished by removal of the Channel Selector and Fine Tuning knobs. The adjustments are accessible, one at a time, through the small hole in the cabinet above and slightly to the left of the channel selector shaft.

PICTURE TUBE SAFETY GLASS CLEANING

To clean safety glass remove 3 wood screws holding metal strip at the bottom edge of the safety glass. Remove metal strip and slide safety glass down and out. Use extreme caution when removing safety glass.

PICTURE TUBE REMOVAL

For picture tube removal it is necessary to remove chassis. (See disassembly instructions).

SERVICE ADJUSTMENT LOCATION

See Tube Placement Chart on Page 5.

SPECIAL ADJUSTMENTS

A. AGC Threshold Control

Tune in the strongest TV station available and adjust the AGC threshold control, located on top of chassis for best stable sync.

HORIZONTAL OSCILLATOR FIELD ADJUSTMENT

To adjust the horizontal oscillator circuit remove the rear cover and supply power to the set. Set the horizontal hold control at its mid-range position and adjust the horizontal frequency slug (B1) until the picture synchronizes horizontally.

SOUND IF DETECTOR BUZZ ADJUSTMENT

To eliminate sound IF detector buzz, adjust the buzz control (R8) located on top of chassis for maximum sound and minimum buzz.

CENTERING

Centering is accomplished mechanically by adjusting two magnetic rings around the neck of the picture tube, located flush against the deflection yoke. Rotate the two rings around the neck of the tube until the picture is properly centered.

RAYTHEON MODELS C-2169B, M, C-2174, UC-2169B, M, UC-2184 (Ch. 21T254AGH, AS)

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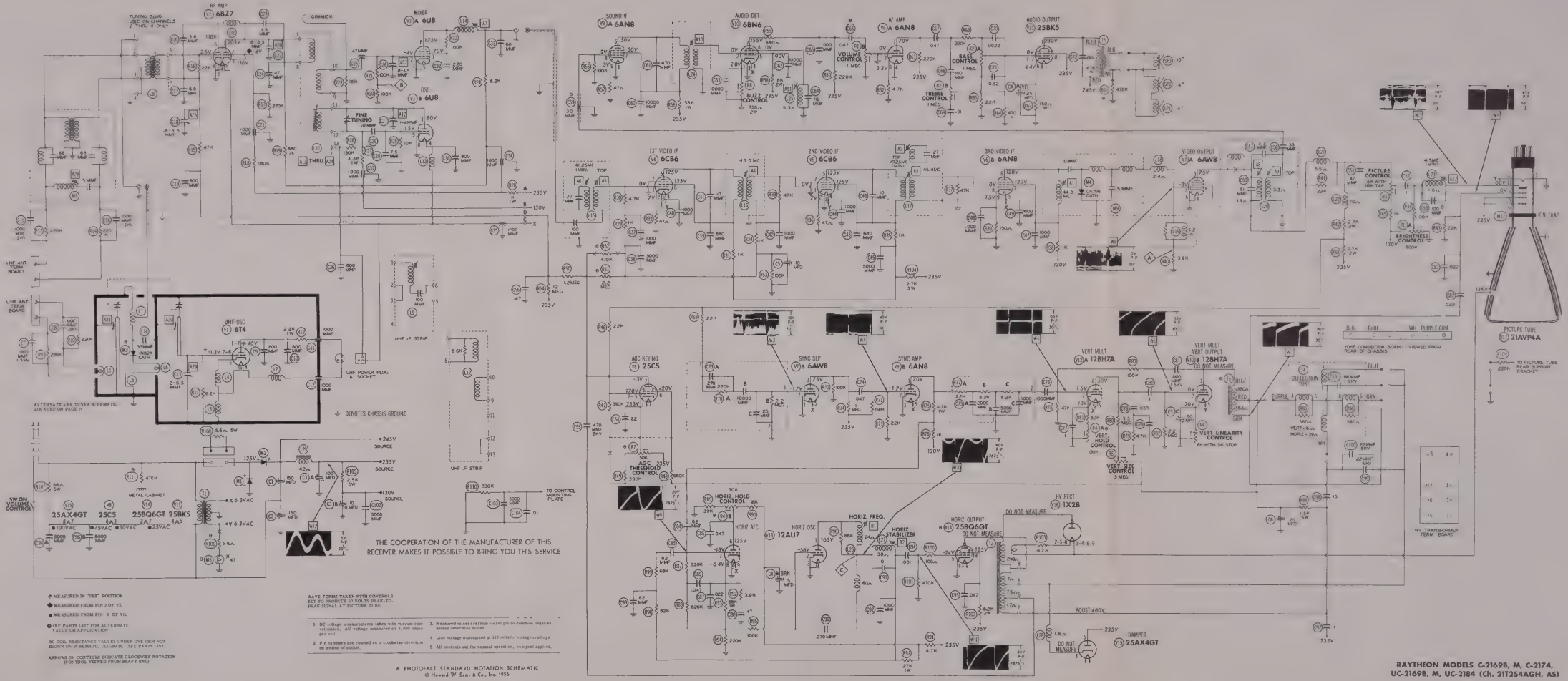
RF AMP V2 6BZ7
MIXER V3 6U8
OSC V3 B 6U8
SOUND IF V9 A 6AN8
AUDIO DET V10 6BN6
AF AMP V6 A 6AN8
AUDIO OUTPUT V11 25BK5
VOLUME CONTROL 1 MEG
BASS CONTROL 1 MEG
TREBLE CONTROL 1 MEG
BUZZ CONTROL
FINE TUNING
1ST VIDEO IF V4 6CB6
2ND VIDEO IF V5 6CB6
3RD VIDEO IF V6 B 6AN8
VIDEO OUTPUT V7 A 6AW8
PICTURE CONTROL
BRIGHTNESS CONTROL
PICTURE TUBE V17 21AVP4A
ION TRAP
UHF OSC V1 6T4
UHF ANT TERM BOARD
UHF POWER PLUG & SOCKET
UHF I.F. STRIP
ADC KEYING V8 25C5
SYNC SEP V7 B 6AW8
SYNC AMP V9 B 6AN8
VERT MULT V12 A 12BH7A
VERT MULT VERT OUTPUT V12 B 12BH7A
VERT HOLD CONTROL
VERT SIZE CONTROL
VERT LINEARITY CONTROL
DEFLECTION YOKE
YOKE CONNECTOR BOARD - VIEWED FROM REAR OF CHASSIS
AGC THRESHOLD CONTROL
HORIZ. HOLD CONTROL
HORIZ AFC
HORIZ OSC V13 12AU7
HORIZ. FREQ.
HORIZ STABILIZER
HORIZ OUTPUT V14 25BQ6GT
HV RECT V16 1X2B
DAMPER V15 25AX4GT
BOOST 460V
HV TRANSFORMER TERM BOARD
SW ON VOLUME CONTROL
25AX4GT V15 25C5 V8 25BQ6GT V11 25BK5 V5
100VAC 75VAC 50VAC 25VAC
245V SOURCE
235V SOURCE
130V SOURCE
METAL CABINET
TO CONTROL MOUNTING PLATE
ALTERNATE UHF TUNER SCHEMATIC INDICATED ON PAGE 14
DENOTES CHASSIS GROUND
THE COOPERATION OF THE MANUFACTURER OF THIS RECEIVER MAKES IT POSSIBLE TO BRING YOU THIS SERVICE
WAVE FORMS TAKEN WITH CONTROLS SET TO PRODUCE 50 VOLTS PEAK-TO-PEAK SIGNAL AT PICTURE TUBE
DC COIL RESISTANCE VALUES UNDER ONE OHM NOT SHOWN ON SCHEMATIC DIAGRAM. SEE PARTS LIST.
ARROWS ON CONTROLS INDICATE CLOCKWISE ROTATION (CONTROL VIEWED FROM SHAFT END)
1 DC voltage measurements taken with vacuum tube voltmeter. AC voltage measured at 1,000 ohms per volt
2 Pin numbers are counted in a clockwise direction on bottom of socket.
3 Measured values are from socket pin to common negative unless otherwise stated
4 Line voltage maintained at 117 volts for voltage readings
5 All controls set for normal operation, no signal applied.
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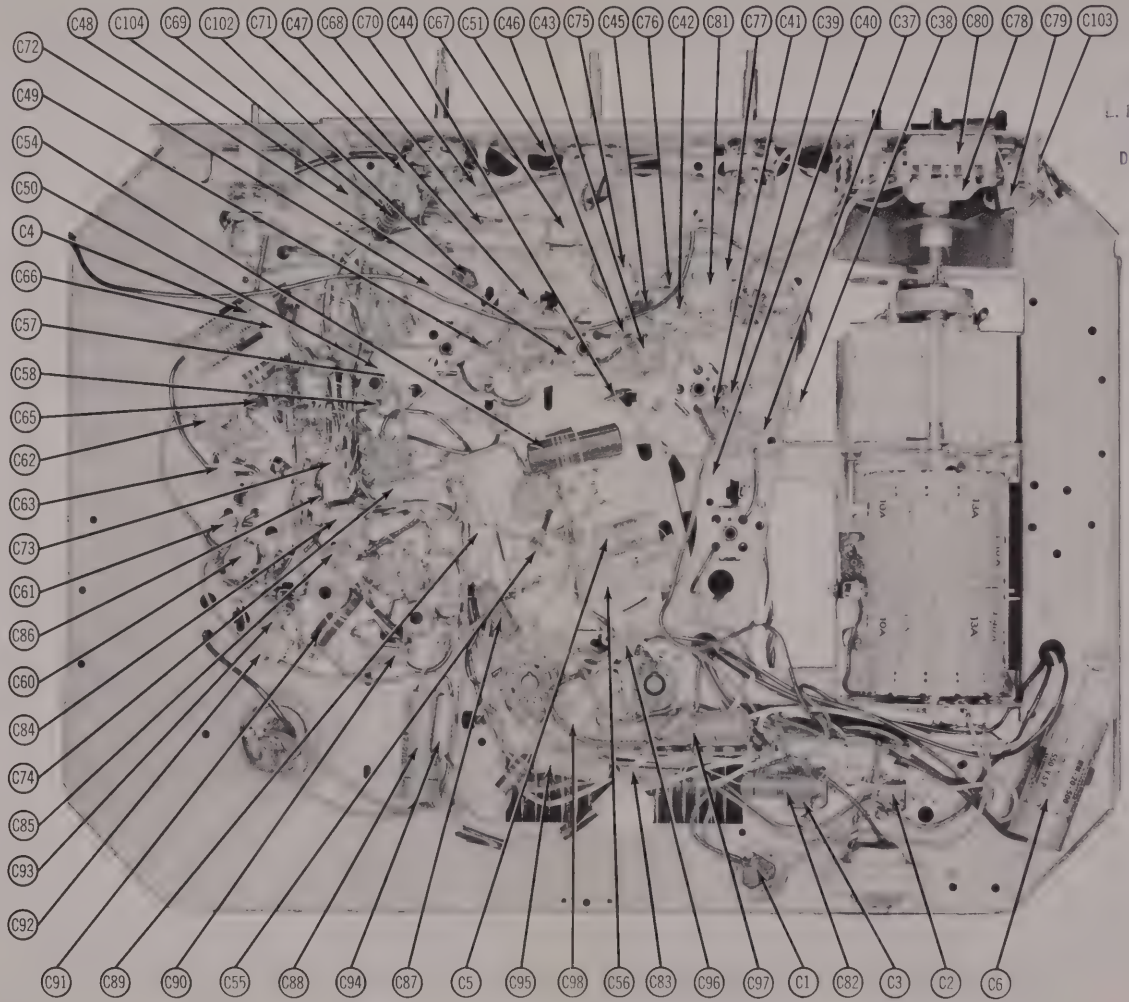
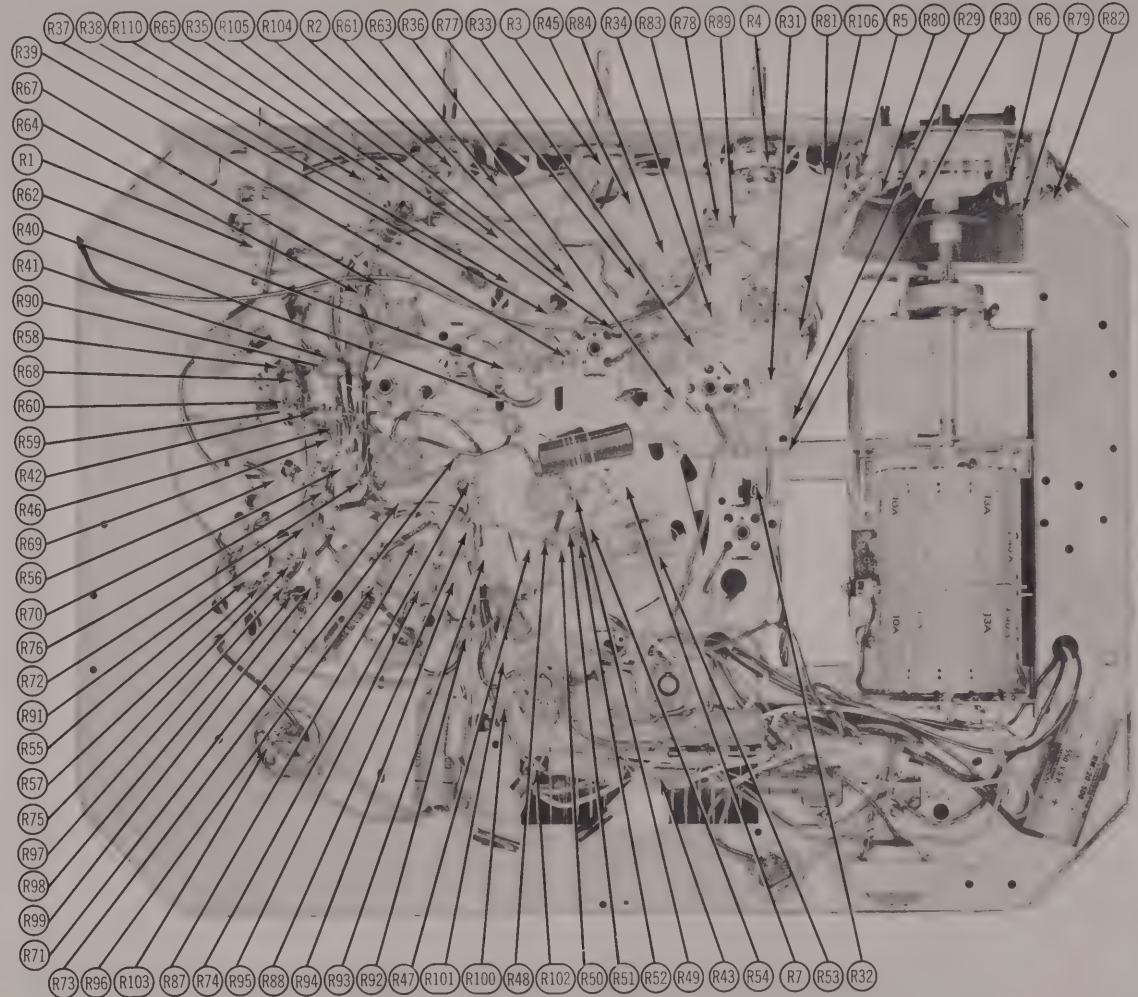
RAYTHEON MODELS C-2169B, M, C-2174, UC-2169B, M, UC-2184 (Ch. 21T254AGH, AS)



CHASSIS BOTTOM VIEW-CAPACITOR IDENTIFICATION



CHASSIS BOTTOM VIEW-RESISTOR IDENTIFICATION

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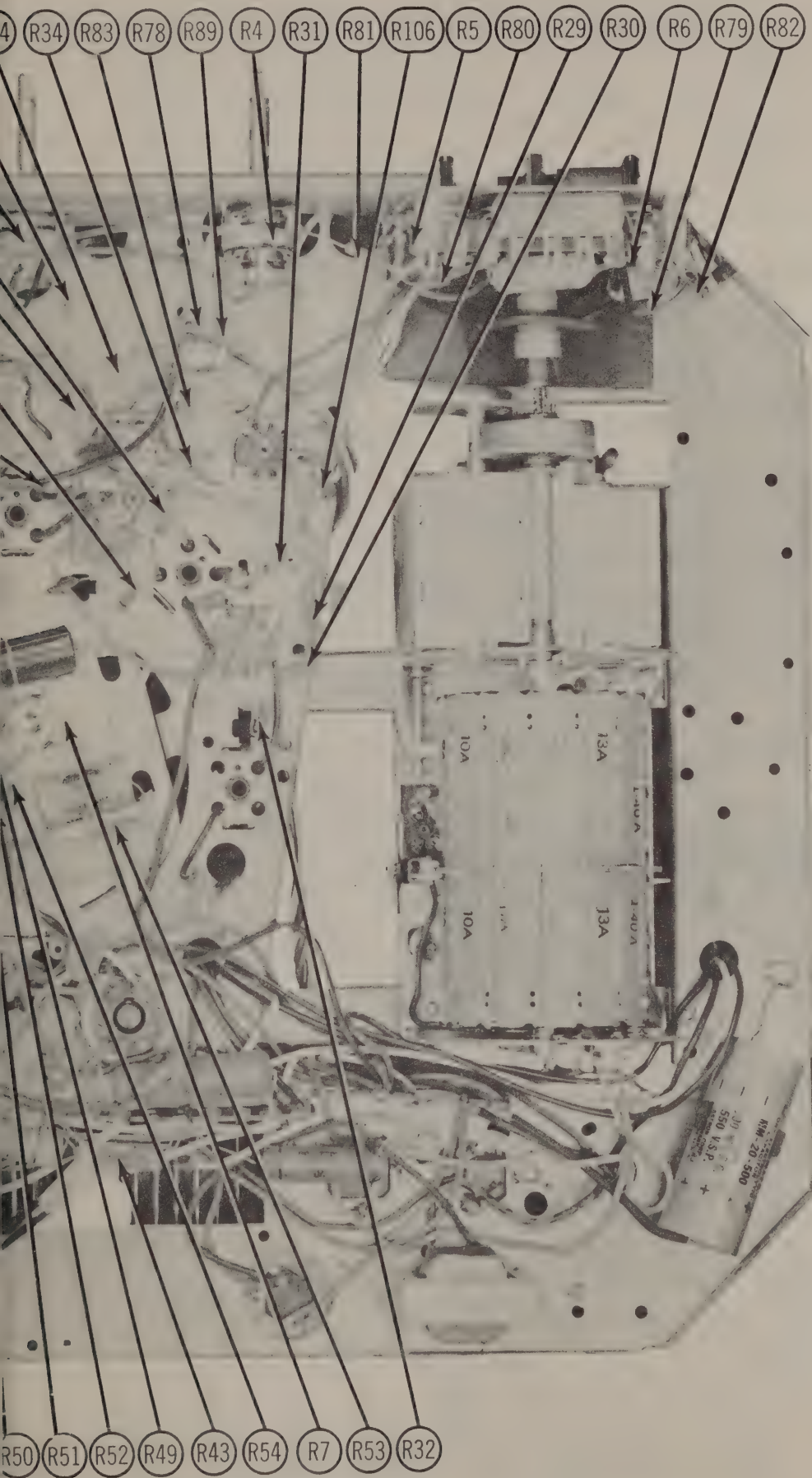
DENVER, [illegible]



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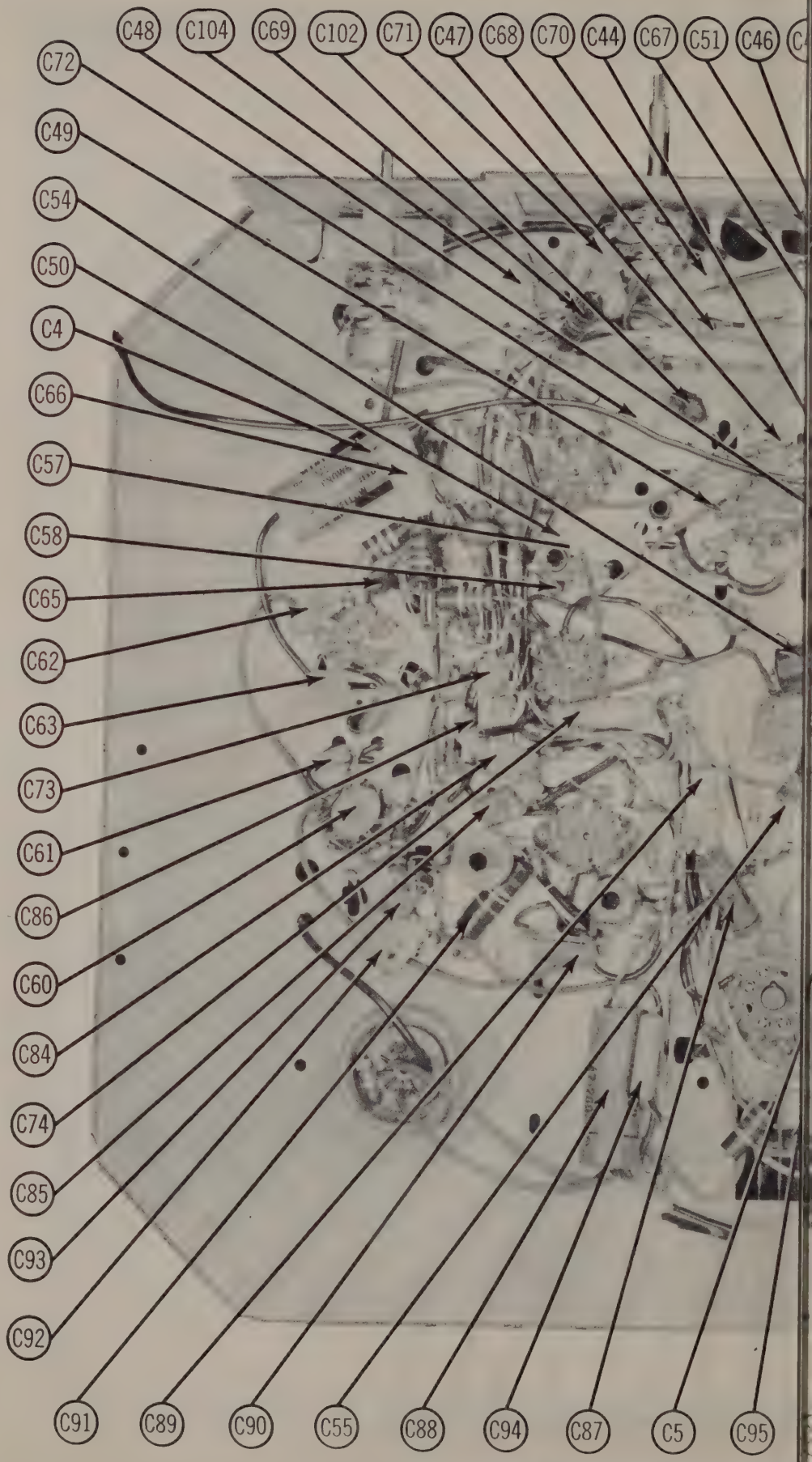
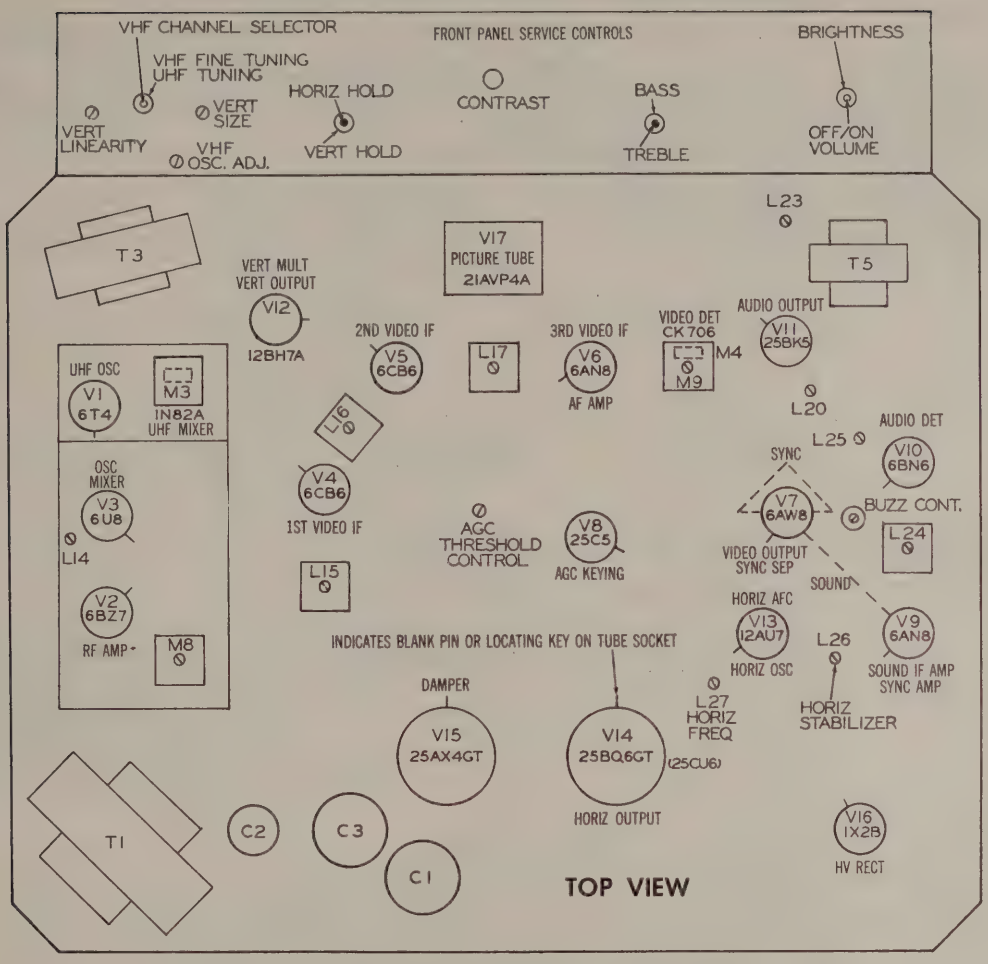
RESISTOR IDENTIFICATION



CHASSIS BOTTOM VIEW

TUBE PLACEMENT CHART



TUBE FAILURE CHECK CHART

The following chart lists tubes whose failures are most likely to produce the indicated symptoms. Refer to tube placement chart for location and type of tube.

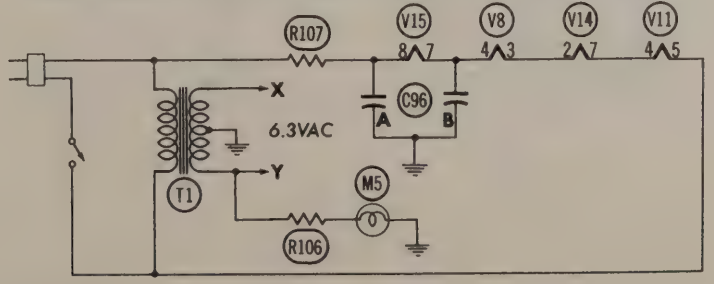
POWER SUPPLY FAILURE
No raster, no sound - Selenium Rectifiers (M1 & M2)

LOSS OF PICTURE OR SOUND
No pic, no sound, has raster - V3, V4, V5, V6, V7 (V1 UHF Only)
No pic, no sound, has snow - V2, V3, V4
No pic, has sound, has raster - V7, V17
Has pic, no sound - V6, V9, V10, V11
Overloaded picture - V8

SYNC FAILURE
No vert. sync - V9, V12
No horiz. sync - V9, V13
No vert. or horiz. sync - V7, V9

SWEEP FAILURE
No raster, has sound - V13, V14, V15, V16, V17
No vertical deflection - V12
Poor vert. linearity or foldover - V12
Poor horiz. linearity or foldover - V13, V14, V15
Narrow picture - V13, V14, V15, V16, M1, M2
Vert. off freq. - V9, V12
Horiz. off freq. - V9, V13

Note: Since this receiver employs tubes used in a series-parallel filament network, an open filament in any tube in series may cause the set to be inoperative. (See Circuit Below).



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ALIGNMENT INSTRUCTIONS

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

Use an isolation transformer to protect the test equipment.
The high voltage lead should be securely taped and kept away from chassis. Do not remove the horizontal oscillator tube (V13) to disable the high voltage.

VIDEO IF ALIGNMENT

The local oscillator should be disabled to reduce the possibility of erroneous indications. This may be done by removing the bottom tuner shield of the VHF tuner and placing a piece of transparent cellulose tape across the first two contacts (from front of VHF tuner) of an unused channel strip then switching the tuner to this insulated channel strip.
Connect a .001MFD capacitor across the vertical input terminals of the oscilloscope.
Connect the synchronized sweep voltage from the sweep generator to the horizontal input of the oscilloscope for horizontal deflection.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
1.	.001MFD	High side to pin 1 (grid) of 6CB6 (V4). Low side to chassis.	Not used	44.3MC (Unmod)	Any	Use VTVM. DC probe to point Ⓐ. Common to chassis.	A1	Attenuate generator output not to exceed 2 volts at VTVM. Adjust for maximum deflection.
2.	"	"	"	47.25MC	"	"	A2	Adjust for MINIMUM deflection.
3.	"	"	"	45.4MC	"	"	A3	Adjust for maximum deflection. Repeat step 2.
4.	"	"	"	43.0MC	"	"	A4	Adjust for maximum deflection.
5.	"	"	43.0MC (10MC Swp)	42.5MC 45.6MC	"	Vert. Amp. thru 10KΩ to point Ⓐ. Low side to chassis.		Use only enough sweep generator output for usable pattern on scope. Check for response curve similar to Fig. 1. If necessary retouch A1 thru A4 for desired response.
6.	Direct	High side to an ungrounded tube shield floating over converter tube (V3). Low side to chassis.	Not used	41.25MC (Unmod)	"	Use VTVM. DC probe to point Ⓐ. Common to chassis.	A6	Adjust for MINIMUM deflection.
7.	"	"	43.0MC (10MC Swp)	41.25MC 42.5MC 45.6MC 47.25MC	"	Vert. Amp. thru 10KΩ to point Ⓐ. Low side to chassis.	A5, A7	Adjust A6 and A7 for response curve similar to Fig. 2. 42.5MC and 45.6MC markers should be at 50% on response curve. Adjust A6 for proper bandwidth and position of 42.5MC and 45.6MC markers. Adjust A7 for maximum amplitude and minimum tilt. Increase generator output to observe 41.25MC and 47.25MC traps. If necessary, SLIGHTLY retouch A6 and A2 for correct 41.25MC and 47.25MC trap positions. If unable to obtain correct response curve as in Fig. 2, repeat steps 1 thru 7.

SOUND IF ALIGNMENT

Remove the strip of transparent cellulose tape from tuner strip and replace tube shield over converter tube.
Tune in a TV station and adjust the fine tuning control until sound bars just appear in the picture. Adjust A8 fully counter-clockwise, then clockwise until the horizontal scanning lines are smooth and continuous. Readjust the fine tuning control for clearest picture and best sound. Insert an attenuator in series with the antenna terminals so that the signal strength may be varied from weak to strong. If a suitable attenuator is not available stray feed the signal to the receiver by placing the antenna lead near the antenna terminals. Reduce the signal strength input to the receiver so that the signal falls below the limiting level of the 6BN6 (V10) as evidenced by a hiss in the sound. Adjust the secondary of the sound take-off transformer (A9), the sound IF transformer (A10), the quadrature coil (A11), and the buzz control (R8) for maximum sound and minimum buzz. If hiss disappears while making adjustments increase attenuation until hiss reappears.

VHF OSCILLATOR ALIGNMENT

Connect the negative lead of a 1.5 volt battery to the tuner AGC. Connect positive lead to chassis. Complete oscillator alignment may not be necessary. If the oscillator seems to be off frequency approximately the same amount for a majority of the channels it may be possible to correct them in one step using A12. It should be noted that this is an all channel oscillator circuit adjustment and should not be used to correct any individual channel. If adjustment A12 will not bring all channels well within the range of the fine tuning control it will be necessary to adjust the channel strip adjustment screw for each channel that is off frequency. The channel oscillator adjustment screws are reached through a hole just above the channel switch shaft (on VHF/UHF tuner hole extends through UHF tuner). The correct adjustment screw is accessible through this hole as the channel switch is turned to each channel.
Connect the synchronized sweep voltage from the sweep generator to the horizontal input of the oscilloscope for horizontal deflection.
The sweep generator output lead should be terminated with its characteristic impedance, usually 50Ω.
Set the fine tuning control to the mid-position of its range.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
8.	Two 120Ω Carbon Resistors	Across antenna terminals with 120Ω in each lead.	213MC (10MC Swp)	211.25MC 215.75MC	13	Vert. Amp. thru 10KΩ to point Ⓐ. Low side to chassis.	A13	Adjust to place sound marker in trap notch as in Fig. 3. Video marker should be at 50%.
			207MC (10MC Swp)	205.25MC 209.75MC	12		A14	
			201MC (10MC Swp)	199.25MC 203.75MC	11		A15	
			195MC (10MC Swp)	193.25MC 197.75MC	10		A16	
			189MC (10MC Swp)	187.25MC 191.75MC	9		A17	
			183MC (10MC Swp)	181.25MC 185.75MC	8		A18	
			177MC (10MC Swp)	175.25MC 179.75MC	7		A19	
			85MC (10MC Swp)	83.25MC 87.75MC	6		A20	
			79MC (10MC Swp)	77.25MC 81.75MC	5		A21	
			69MC (10MC Swp)	67.25MC 71.75MC	4		A22	
			63MC (10MC Swp)	61.25MC 65.75MC	3		A23	
			57MC (10MC Swp)	55.25MC 59.75MC	2		A24	

ALIGNMENT INSTRUCTIONS (cont)

VHF RF AND MIXER ALIGNMENT

Connect bias as under "VHF Oscillator Alignment".
Connect the synchronized sweep voltage from the sweep generator to the horizontal input of the oscilloscope for horizontal deflection.
The sweep generator output lead should be terminated with its characteristic impedance, usually 50Ω.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
9.	Two 120Ω Carbon Resistors	Across antenna terminals with 120Ω in each lead.	195MC (10MC Swp)	193.25MC 197.75MC	10	Vert. Amp. thru 10KΩ to point (B). Low side to chassis.	A25, A26, A27	Adjust for response curve similar to Fig. 4, with markers above 90%.
10.	"	"	213MC (10MC Swp)	211.25MC 215.75MC	13	"		If markers fall below 70% on any channel, make compromise adjustments of A25, A26 and A27 with channel switch set to that channel. Then recheck all other channels to see that they have not been seriously affected.
			207MC (10MC Swp)	205.25MC 209.75MC	12			
			201MC (10MC Swp)	199.25MC 203.75MC	11			
			189MC (10MC Swp)	187.25MC 191.75MC	9			
			183MC (10MC Swp)	181.25MC 185.75MC	8			
			177MC (10MC Swp)	175.25MC 179.75MC	7			
			85MC (10MC Swp)	83.25MC 87.75MC	6			
			79MC (10MC Swp)	77.25MC 81.75MC	5			
			69MC (10MC Swp)	67.25MC 71.75MC	4			
			63MC (10MC Swp)	61.25MC 65.75MC	3			
			57MC (10MC Swp)	55.25MC 59.75MC	2			

UHF TUNER ALIGNMENT

Connect bias as under "VHF Oscillator Alignment".
Connect the synchronized sweep voltage from the sweep generator to the horizontal input of the oscilloscope for horizontal deflection.
The sweep generator output lead should be terminated with its characteristic impedance, usually 50Ω.
Set channel selector to UHF position.

	DUMMY ANTENNA	SWEEP-GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
11.	Two 120Ω Carbon Resistors	Across UHF antenna terminals with 120Ω in each lead.	470MC (10-15MC Swp)	Not used	14 Low end of UHF band	Vert. Amp. thru 10KΩ to point (A). Low side to chassis.	A29	Use only enough sweep generator output for usable pattern on scope. Adjust for maximum amplitude.
12.	"	"	"	471.25MC 45.75MC	"	"		Loosely couple 45.75MC marker generator to IF output from tuner. Low side to chassis. Adjust the channel selector until RF marker (471.25MC) and IF markers (45.75MC) coincide on response curve as in Fig. 5.
13.	"	"	870MC (10-15MC Swp)	45.75MC	80 high end of UHF band	"	A30	Loosely couple 45.75MC marker generator to IF output from tuner. Adjust A30 to place 45.75MC at 50% on high side of the response curve.
14.	"	"	"	Not used	"	"	A31	Adjust A31 for maximum amplitude of response curve.

IF WAVE TRAP ADJUSTMENT

The IF wave trap should be tuned to minimize interference caused by signals which fall within the video IF bandpass (40-48MC). Tune in a TV station on which interference is noted and adjust A28 for minimum interference in the picture.

4.5MC TRAP ADJUSTMENT

Tune in a TV station and adjust A32 for minimum 4.5MC beat in the picture.

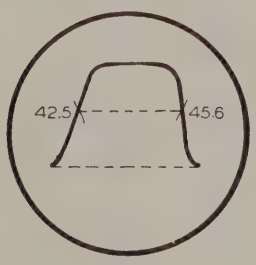

FIG. 1

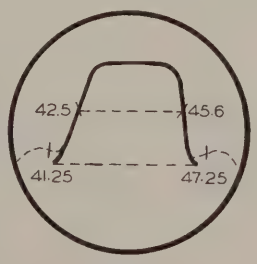

FIG. 2

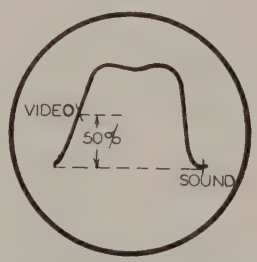

FIG. 3

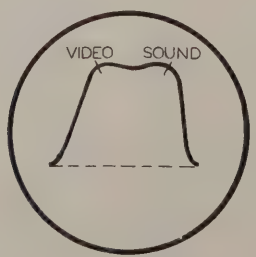

FIG. 4

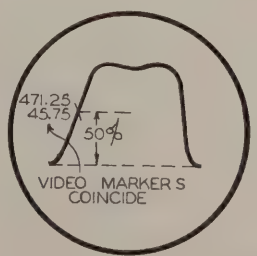

FIG. 5

PROPERTY OF
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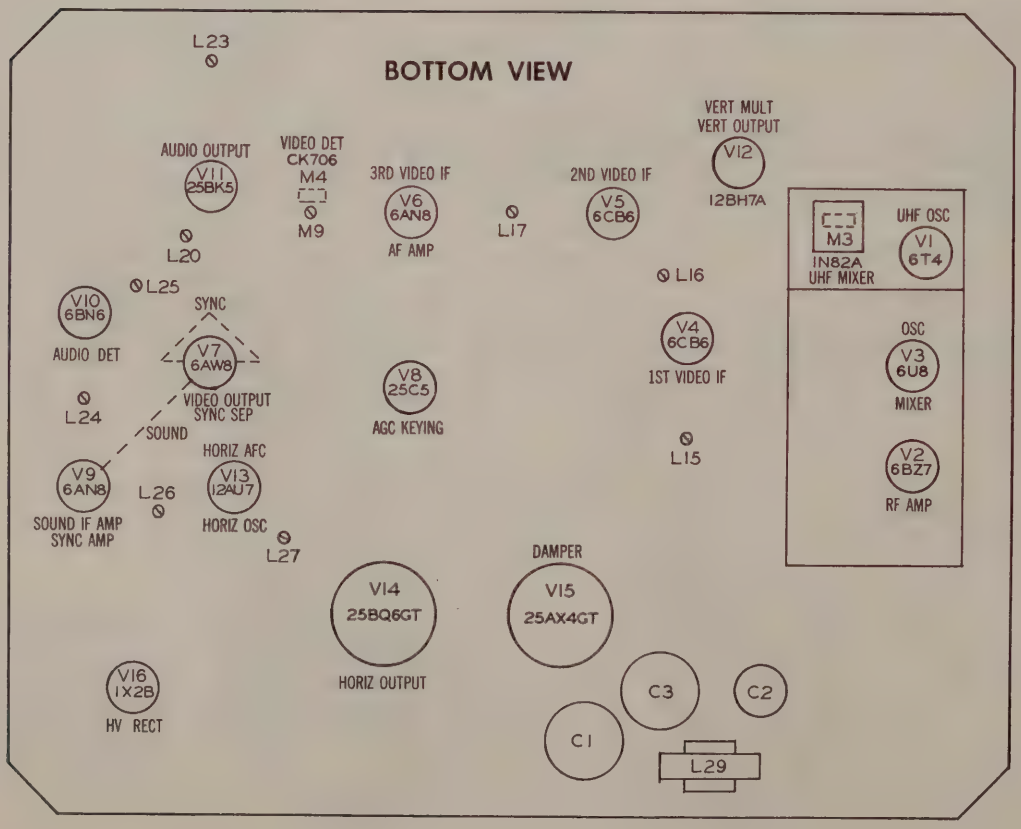
3924 MEADE ST.
DENVER, COLORADO

RESISTANCE MEASUREMENTS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8	Pin 9
V 1	6T4	*†8KΩ	8. 2KΩ	0Ω	. 1Ω	0Ω	8. 2KΩ	*†8KΩ		
V 2	6BZ7	†1. 7KΩ	130KΩ	INF	0Ω	. 1Ω	INF	1. 6Meg	0Ω	0Ω
V 3	6U8	†5. 8KΩ	200KΩ	†100KΩ	. 1Ω	0Ω	†9. 2KΩ	0Ω	0Ω	10KΩ
V 4	6CB6	100KΩ	47Ω	0Ω	. 1Ω	†3. 7KΩ	†3. 7KΩ	0Ω		
V 5	6CB6	100KΩ	47Ω	0Ω	. 1Ω	†3. 7KΩ	†3. 7KΩ	0Ω		
V 6	6AN8	†220KΩ	200KΩ	4. 7KΩ	0Ω	. 1Ω	†3. 5KΩ	†3. 5KΩ	0Ω	150Ω
V 7	6AW8	0Ω	2. 2Meg	†80KΩ	0Ω	. 1Ω	0Ω	3. 9KΩ	†2. 5KΩ	†4. 6KΩ
V 8	25C5	†40Ω	†25KΩ	●20Ω	●25Ω	†25KΩ	▲700KΩ	500KΩ		
V 9	6AN8	†8. 2KΩ	22KΩ	0Ω	0Ω	. 1Ω	†33KΩ	†33KΩ	100KΩ	47Ω
V 10	6BN6	350Ω	. 3Ω	0Ω	. 1Ω	†18KΩ	5. 3Ω	†220KΩ		
V 11	25BK5	†475Ω	NC	170KΩ	●11Ω	●0Ω	150Ω	170KΩ	†42	NC
V 12	12BH7A	▲2. 4KΩ	2. 2Meg	1. 5KΩ	. 1Ω	. 1Ω	▲5Meg	47KΩ	140KΩ	1. 7Ω
V 13	12AU7	†32KΩ	320KΩ	0Ω	0Ω	0Ω	†32KΩ	1. 5Meg	300KΩ	. 1Ω
V 14	25BQ6GT	NC	20Ω	TP	†8. 2KΩ	470KΩ	NC	1Ω	0Ω	TOP CAP ▲8. 6Ω
V 15	25AX4GT	TP	NC	235KΩ	NC	†42Ω	NC	●25Ω	●29Ω	
V 16	1X2B		PINS	1-8	HAVE	INF	RESISTANCE			TOP CAP ▲300Ω
V 17	21AVP4A	0Ω	22KΩ	PIN 6 †42Ω	PIN 10 †42Ω	PIN 11 †250KΩ	PIN 12 . 1Ω			

*MEASURED IN "UHF" POSITION.
†MEASURED FROM OUTPUT OF M2.
▲MEASURED FROM PIN 3 OF V15.
NC-NO CONNECTION.
TP-TIE POINT.
● MEASURED FROM PIN 5 OF V11.



TUBE PLACEMENT CHART

PARTS LIST AND DESCRIPTIONS

TUBES (SYLVANIA, GENERAL ELECTRIC, WESTINGHOUSE)

ITEM No.	USE	REPLACEMENT DATA		RETMA BASE TYPE	NOTES
		RAYTHEON PART No.	STANDARD REPLACEMENT		
V1	UHF Oscillator	6T4	6T4	7DK	
V2	RF Amplifier	6BZ7	6BZ7	9AJ	
V3	Mixer-Osc.	6U8	6U8	9AE	
V4	1st. Video IF Amp.	6CB6	6CB6	7CM	
V5	2nd. Video IF Amp.	6CB6	6CB6	7CM	
V6	3rd. Video IF Amp.- AF Amplifier	6AN8	6AN8	9DA	
V7	Video Output- Sync Separator	6AW8	6AW8	9DX	
V8	AGC Keying	25C5	25C5	7CV	
V9	Sound IF Amp.- Sync Amplifier	6AN8	6AN8	9DA	
V10	Audio Detector	6BN6	6BN6	7DF	
V11	Audio Output	25BK5	25BK5	9BQ	
V12	Vert. Mult.- Vert. Output	12BH7A	12BH7A	9A	
V13	Horiz. AFC- Horiz. Osc.	12AU7	12AU7	9A	
V14	Horiz. Output	25BQ6GT	25BQ6GT	6AM	25CU6 used as an alternate
V15	Damper	25AX4GT	25AX4GT	4CG	
V16	HV Rectifier	1X2B	1X2B	9Y	

PROPERTY OF
L. F. BLANKENSHIP
3924 MEADE ST.
DENVER, COLORADO

CATHODE-RAY TUBE

ITEM No.	REPLACEMENT DATA					RETMA BASE TYPE	NOTES
	RAYTHEON PART No.	CBS PART No.	GENERAL ELECTRIC PART No.	SYLVANIA PART No.	WESTINGHOUSE PART No.		
V17	21AVP4A ①	21AVP4A ①		21AVP4A ② 21AVP4	21AVP4A ① 21AVP4	12L 12L	① Aluminized ② Silver screen

ELECTROLYTIC CAPACITORS

ITEM No.	RATING		REPLACEMENT DATA				NOTES
	CAP.	VOLT.	RAYTHEON PART No.	MALLORY PART No.	PYRAMID PART No.	SANGAMO PART No.	
C1	150	150	8C-22464	FP117	TM-150-150	T-050	
C2	150	150	8C-22463	FP117	TM-150-150	T-050	
C3A	▲100	300	8C-22523	FP326.6	TM-3137	T-537	
B	■10	300				FM-0550	
C	▲60	50					
C4A	25	25	8C-24193	TC26	TD-25-25	FM-0225	Yellow
B	5	300		TC60	TD-8-350	FM-3508	Brown
C5	10	50	8C-18128	TC32	TD-10-50	FM-0510	
C6	20	500	8C-25094	TC83	TD-20-500	S-315	

FIXED CAPACITORS

Capacity values given in the rating column are in mfd. for Paper Capacitors, and in mmfd. Mica and Ceramic Capacitors.

ITEM No.	RATING		REPLACEMENT DATA				NOTES
	CAP.	VOLT.	RAYTHEON PART No.	CENTRALAB PART No.	ERIE PART No.	MALLORY PART No.	
C7	1000	1500	8G-22656	DD30-102	1R5KV-102	DC3021	
C8	1000	1500	8G-22656	DD30-102	1R5KV-102	DC3021	
C9	800		103G-24769	DD-801	831-801	DC-521	
C10	800		103G-24769	DD-801	831-801	DC-521	
C11	1000		103G-24756				
C12	1000		103G-24756				
C13	2-5.5						
C14	33		103G-24770	TCN-33	N750K-330		
C15	1000	1500	8G-22656	DD30-102	1R5KV-102	DC3021	
C16	1000	1500	8G-22656	DD30-102	1R5KV-102	DC3021	
C17	6.8		103G-24754	TCZ-6R8	NP0A-6R8	ZT-5568	
C18	.8-3.5		103G-24753	829-4	3115-01-10	CT551	
C19	800		103G-24755	DD-801	831-801	DC-521	
C20	3.6		103G-24758				
C21	1000		103G-24757				
C22	.8-3.5		103G-24760	829-4	3115-01-10	CT551	
C23	1.5		103G-24759	TCZ-1R5	NP0A-1R5	ZT-5515	
C24	47		103G-24761	DD-470	831-470	UC-5447	
C25	47		103G-24762	MFT-50			
C26	.8-3.5		103G-24764	829-4	3115-01-10	CT551	
C27	1-4		103G-24767	829-4	3115-01-10	CT551	
C28	7.5		103G-24765				
C29	10		103G-24766				
C30	800		103G-24755	DD-801	831-801	DC-521	
C31	1000		103G-24756				
C32	220		103G-24763	DD-221	811-221	UC-5322	
C33	68		103G-24768	TCN-68	N750L-680		
C34	1000		103G-24756				
C35	1000		103G-24756				
C36	800		103G-24755	DD-801	831-801	DC-521	
C37	1000		8G-13201	DD-102	801-001	DC-521	
C38	5000		8G-13962	DD-502	811-005	DC-502	
C39	680		8G-21105	D6-681	GP2K-681	UC-5368	
C40	1000		8G-13201	DD-102	801-001	DC-521	
C41	10		8G-19502	D6-100	GP1K-100	UC-541	
C42	1000		8G-13201	DD-102	801-001	DC-521	
C43	680		8G-21105	D6-681	GP2K-681	UC-5368	
C44	1000		8G-13201	DD-102	801-001	DC-521	
C45	5000		8G-13962	DD-502	811-005	DC-525	
C46	10		8G-19502	D6-100	GP1K-100	UC-541	
C47	1000		8G-20754	D6-102	GP2L-102	UC-521	
C48	1000		8G-20754	D6-102	GP2L-102	UC-521	
C49	1000		8G-13201	DD-102	801-001	DC-521	
C50	51		8G-23793				
C51	47		8G-20740	DD-470	831-470	UC-5447	
C52	.1	400	8K-23095	DF-104		PT401	
C53	100	500		D6-101	811-101	MCB235	Note 1
C54	.22	400	8K-23097			PT4022	
C55	470	2000	8G-24999	DD30-471	3KV-471	DC30347	
C56	.47	200	8K-23087			PT4047	
C57	3.3		8L-23551	TCZ-3R3	NP0A-3R3	ZT-5533	

CAPACITORS (cont)

ITEM No.	RATING CAP.	RATING VOLT.	REPLACEMENT DATA RAYTHEON PART No.	CENTRALAB PART No.	ERIE PART No.	MALLORY PART No.	NOTES
C58	33		8G-19503	TCZ-33	NP0L-330	ZT-5433	
C59	30		14B-23772				Note 2
C60	10000		8G-20269	DD-103	811-01	DC-511	
C61	470	500	8F2-121	D6-471	811-471	MCB245	
C62	10000		8G-20269	DD-103	811-01	DC-511	
C63	10000		8G-20269	DD-103	811-01	DC-511	
C64	10		8G-11789	TCZ-10	NP0K-100	ZT-541	
C65	1000		8G-13201	DD-102	801-001	DC-521	
C66	.047	400	8K-23094	DF-503		PT4147	Note 3
C67	.047	400	8K-23094	DF-503		PT4147	
C68	100		8G-22657	D6-101	GP1K-101	UC-531	
C69	.01	400	8K-23080	D6-103	GP3-333-103	PT411	
C70	.0022	400	8K-23078	D6-222	GP2-333-222	PT6222	
C71	.022	200	8K-23082	DF-203	817-02	PT4122	
C72	.001	600	8K-23099	D6-102	GP2L-102	PT621	
C73A	270				811-271	UC-5327	
B	10000		†17A-24212	†PC-263	811-01	DC-511	
C	25				831-250	UC-5425	
C74	.047	200	8K-23083	DF-503		PT4147	
C75A	2000					DC-523	
B	5000		♦17A-22376	♦PC-100	♦1405-01	DC-525	
C	5000					DC-525	
C76	1000		8G-20754	D6-102	GP2L-102	UC-521	
C77	.1	200	8K-23084	DF-104		PT401	
C78	.033	400	8K-23816	DF-303		PT6133	
C79	.1	200	8K-23084	DF-104		PT401	
C80	.1	400	8K-23095	DF-104		PT401	
C81	1000	1500	8G-24991	DD30-102	1R5KV-102	DC3021	
C82	.022	600	8K-23104	DF-203	817-02	PT6122	
C83	.022	200	8K-23082	DF-203	817-02	PT4122	
C84	82	500	8F3-112	D6-820	801-820		
C85	82	500	8F3-112	D6-820	801-820		
C86	.047	400	8K-23094	DF-503		PT4147	
C87	.022	200	8K-23082	DF-203	817-02	PT4122	
C88	.47	200	8K-23087			PT4047	
C89	.047	200	8K-23083	DF-503		PT4147	
C90	270	500	8F5-235	TCZ-270	NP0-335-271	MCE241	
C91	.01	600	8M-24439				
C92	1000	500	8F7-125		811-102	MCB255	
C93	82	500	8F3-112	D6-820	801-820		
C94	.001	600	8K-23099	D6-102	GP2L-102	PT621	
C95	.047	400	8K-23094	DF-503		PT4147	
C96A	5000		8G-23790	DD2-502	811-005	DC-525	
B	5000				811-005	DC-525	
C97	.1	600	8K-23106	DF-104		PT601	
C98	.15	200	8K-23085			PT4015	
C99	22	5000	8G-24719	DD60-220	6KV-220	DC60422	
C100	22	5000	8G-24719	DD60-220	6KV-220	DC60422	
C101	68	1500	8G-24709	DD30-680	1R5KV-680	DC30468	
C102	5000		8G-13962	DD-502	811-005	DC-525	
C103	5000		8G-13962	DD-502	811-005	DC-525	
C104	.01	400	8K-23091	D6-103	GP3-333-103	PT411	

Note 1. Not used in some versions.
Note 2. C59 is sound IF coupling shielded lead having 30MMF capacity.
Note 3. Some versions use .01MFD in this application (part #8K-23091).
† Items C73A, C73B, C73C, R70B and R70B are combined in one unit.
♦ Items C75A, C75B, C75C, R77A, R77B and R77C are combined in one unit.

CONTROLS

ITEM No.	RATING RESISTANCE	RATING WATTS	REPLACEMENT DATA RAYTHEON PART No.	CENTRALAB PART No.	CLAROSTAT PART No.	IRC PART No.	MALLORY PART No.	INSTALLATION NOTES
R1A	500KΩ	½	10A-24986	F1-40	RTV-528	QJ-808▲	UF55L } †	Brightness (Panel)
B	1Meg			R2-52			UR16A } †	Volume (Rear) Attach to R1A.
C	Switch			KB-1			US-26	Attach to R1B.
R2A	1 Meg	½	10B-24592	F1-51	RTV-529	QJ-809♦♦	UF16L } ▪	Bass (Panel)
B	1Meg	½		R2-51			UR16L } ▪	Treble (Rear)Attach to R2A.
R3A	15KΩ	½	10B-24997	ABT-154		Q17-118X		Picture (Tap at 10KΩ)
B	Shaft		Not Req.	AK-3		Not Req.		Attach to R3A.
R4A	150KΩ	½	10B-24142-1	F1-32	RTV-530	QJ-772††	UE1248	Vertical Hold (Panel)
B	50KΩ	½		R2-29				Horizontal Hold (Rear) Attach to R4A.
R4A	150KΩ	½	10B-24242-1	F1-32	RTV-530	QJ-772††	UE1248	Vertical Hold } Used as an
B	50KΩ	½		R2-29				Horizontal Hold } alternate in some versions.
R5A	3Meg	½	10B-23696	AB-84	A47-3Meg-S	Q11-140	TA36L	Vertical Size
B	Shaft		Not Req.	AK-1	FKS-1/4	RQ	Not Req.	Attach to R5A.
R6A	6000Ω	½	10B-23407	AB-10♦	A47-5000-S♦	Q11-114♦	TA53L♦	Vertical Linearity (Stop at 5000Ω)
B	Shaft		Not Req.	AK-1	FKS-1/4	RQ	Not Req.	Attach to R6A.
R7A	50KΩ	½	10B-23694	AB-31	A47-50K-S	Q11-123		AGC Threshold
B	Shaft		Not Req.	AK-19	RN-3	TQ		Attach to R7A.
R7	50KΩ	½	10B-23694					AGC Threshold (Used as an alternate in some versions)
R8	750Ω	2	10D-23857		39-750			Buzz (Wire Wound)

♦Connect a 1000Ω resistor in series with the right hand terminal of the control and the lead connecting to the same terminal of the original control (control viewed from shaft end, terminals down).
†Universal Replacement (Mallory Exact Duplicate Part No. UE1486S).
▪Universal Replacement (Mallory Exact Duplicate Part No. UE1676).
▲Concentrikit Equivalent; K-2 Kit, Base Elements and Shafts; B11-133, P1-102 (Panel) B13-137, R2-117 (Rear) 76-1 (Switch)
♦♦Concentrikit Equivalent; K-2 Kit, Base Elements and Shafts; B11-137, P1-109 (Panel) B11-137, R2-124 (Rear)
††Concentrikit Equivalent; K-2 Kit, Base Elements and Shafts; B11-328, P7-109 (Panel) B11-123, R2-124 (Rear)

RESISTORS

ITEM No.	RATING OHMS	RATING WATT	REPLACEMENT DATA RAYTHEON PART No.	IRC PART No.	NOTES
R9	220KΩ	½	9B1-27	BTS-220K	
R10	220KΩ	½	9B1-27	BTS-220K	
R11	8200Ω	½			
R12	2200Ω	1			
R13	220KΩ	½	9B1-27	BTS-220K	
R14	220KΩ	½	9B1-27	BTS-220K	
R15	47KΩ	½	9B1-82	BTS-47K	
R16	22KΩ	½	9B1-78	BTS-22K	
R17	270KΩ	½		BTS-270K	
R18	180KΩ	½		BTS-180K	
R19	680Ω	½		BTS-680	
R20	100KΩ	½	9B1-86		
R21	100KΩ	½	9B1-86		
R22	100KΩ	½	9B1-86		
R23	15KΩ	½			
R24	8200Ω	½			
R25	10KΩ	½			
R26	150KΩ	½			
R27	3300Ω	1		BTA-3300	
R28	1000Ω	1		BTA-1000	
R29	1000Ω	½	9B1-62	BTS-1000	
R30	4700Ω	½	9B1-70		
R31	1000Ω	½	9B1-62	BTS-1000	
R32	47Ω	½	9B1-46	BTS-47	

PARTS LIST AND DES

RESISTO

ITEM No.	RATING OHMS	RATING WATT	REPLACEMENT DATA RAYTHEON PART No.	IRC PART No.	NOTES
R33	47KΩ	½	9B1-82		
R34	1000Ω	½	9B1-62	BTS-1000	
R35	1000Ω	½	9B1-62	BTS-1000	
R36	47Ω	½	9B1-46	BTS-47	
R37	47KΩ	½	9B1-82		
R38	1000Ω	½	9B1-62	BTS-1000	
R39	150Ω	½	9B1-52	BTS-150	
R40	3900Ω	½	9B1-69	BTS-3900	
R41	22KΩ	½	9B1-78	BTS-22K	
R42	2700Ω	2	9B4-71	BTB-2700	
R43	22KΩ	½	9B1-78	BTS-22K	
R44	100KΩ	½	9B1-86	BTS-100K	
R45	1000Ω	½	9B1-62	BTS-1000	
R46	22KΩ	½	9B1-78	BTS-22K	
R47	390K	½	9B1-93	BTS-390K	
R48	680KΩ	½	9B1-96	BTS-680K	
R49	330KΩ	½	9B1-92	BTS-330K	
R50	1. 2Meg	½	9B1-99	BTS-1. 2Meg	
R51	2. 2Meg	½	9B1-102	BTS-2. 2Meg	Note 1
R52	470KΩ	½	9B1-94	BTS-470K	Note 2
R53	100KΩ	½	9B1-86	BTS-100K	
R54	12Meg	½	9B1-411	BTS-12Meg	
R55	100KΩ	½	9B1-86	BTS-100K	
R56	33KΩ	1	9B2-80	BTA-33K	
R57	47Ω	½	9B1-46	BTS-47	
R58	18KΩ	2	9B4-77	BTB-18K	
R59	680Ω	½	9B1-60	BTS-680	
R60	220KΩ	½	9B1-90	BTS-220K	
R61	220KΩ	½	9B1-90	BTS-220K	
R62	4700Ω	½	9B1-70	BTS-4700	
R63	220KΩ	½	9B1-90	BTS-220K	
R64	470KΩ	½	9B1-29	BTS-470K	
R65	22KΩ	½	9B1- 78	BTS-22K	
R66	470KΩ	½	9B1-29	BTS-470K	Note 2
R67	150Ω	1	9B2-52	BTA-150	
R68	2700Ω	2	9B4-67	BTB-2700	
R69	22KΩ	½	9B1-78	BTS-22K	
R70A	220KΩ	½	†17A-24212	BTS-220K	
B	2. 2Meg	½		BTS-2. 2Meg	
R71	150KΩ	½	9B1-88	BTS-150K	
R72	100KΩ	½	9B1-86	BTS-100K	

Note 1. In some versions a 330KΩ ½
Note 2. Not used in some versions.
† Items C73A, C73B, C73C, R70A,
♦ Items C75A, C75B, C75C, R77A,

TRANSFORME

ITEM No.	RATING PRI.	RATING SEC. 1	RATING SEC. 2	RATING SEC. 3	RAYTHEON PART No.
T1	117VAC ② .29A	12. 6VCT ③ 2. 4A			12D-23699

① Drill one new mounting hole.

TRANSFORMERS (

ITEM No.	USE	RAYTHEON PART No.	Halldorson PART No.	Merit PART N
T2	Horiz. Output Trans.	12E-24612-1		
T3	Vert. Output Trans.	12E-23726	Z1804	A-3037
		12E-19048-2 ①	Z1804	A-3037
T4 A	Yoke-Horiz. (25MH)	201-24632-1		MDF-7
B	Vert. (41. 5MH)			②

① Alternate vertical output transformer.
② Use original yoke rear cover and centering device.
③ Use original horizontal damping network.

TRANSFORMER (A

ITEM No.	IMPEDANCE PRI.	IMPEDANCE SEC.	REPLACEMENT D RAYTHEON PART No.	Halldorson PART No.	Merit PART No.	P
T5	6.7KΩ	3.3Ω	12C-24591	Z1112 ①	A-3020 ②	A

SPEA

ITEM No.	RATINGS SIZE	FIELD	V. C. IMP.	REPLACEMENT DATA RAYTHEON PART No.	QUAM PART No
SP1	4"	PM	5.9Ω	18A-24163	4A07
SP2	4"	PM	5.9Ω	18A-24163	4A07
SP3	10"	PM	3.5Ω	18A-24176	10A6A

COILS

ITEM No.	USE	DC RES. PRI.	DC RES. SEC.	RAYTHEON PART No.	ME PA
L1	UHF Ant. Coil	0Ω CT			
L2	Fil. Choke	0Ω		83-64245	
L3	Fil. Choke	0Ω		83-64245	
L4	Cathode Choke	0Ω		83-64246	
L5	UHF Mixer Coil	0Ω			
L6	UHF Osc. Coupling Coil	0Ω			
L7	UHF IF Output	0Ω		83C-64661	
L8A	VHF Ant. Coil	0Ω CT	0Ω	103G-24771	

PARTS LIST AND DESCRIPTIONS (Continued)

CAPACITORS (cont)

ITEM No	RATING CAP	VOLT	REPLACEMENT DATA RAYTHEON PART No.	CENTRALAB PART No.	ERIE PART No.	MALLORY PART No.	NOTES
C58	33		8G-19503	TCZ-33	MP0L-330	ET-5433	
C59	30		14B-23772				Note 2
C60	10000		8G-20269	DD-103	811-01	DC-511	
C61	470	500	8F3-121	DS-471	811-471	MC2S45	
C62	10000		8G-20269	DD-103	811-01	DC-511	
C63	10000		8G-20269	DD-103	811-01	DC-511	
C64	10		8G-11769	TCZ-10	MP0L-100	ET-541	
C65	1000		8G-13251	DD-102	801-001	DC-511	
C66	.047	400	8K-23094	DF-503		PT4147	Note 3
C67	.047	400	8K-23094	DF-503		PT4147	
C68	100		8G-23657	DS-101	GP1K-101	UC-531	
C69	.01	400	8K-23080	DS-103	GP3-333-103	PT411	
C70	.0022	400	8K-23078	DS-222	GP2-333-222	PT5122	
C71	.022	200	8K-23092	DF-203	817-02	PT4122	
C72	.001	600	8K-23099	D6-102	GP2L-102	PT521	
C73A	270		†17A-34313	†PC-363	811-01	UC-5327	
	B 10000				831-250	DC-511	
	C 33					DC-5425	
C74	.047	200	8K-23083	DF-503		PT4147	
C75A	2000					DC-522	
	B 5000		♦17A-32376	♦PC-100	♦1405-01	DC-525	
	C 5000					DC-525	
C76	1000		8G-20754	D6-102	GP2L-102	UC-511	
C77	.1	200	8K-23086	DF-104		PT401	
C78	.033	400	8K-23838	DF-303		PT5133	
C79	.1	200	8K-23084	DF-104		PT401	
C80	.1	400	8K-23085	DF-104		PT401	
C81	1000	1500	8G-24990	DD20-102	1R5KV-102	DC3021	
C82	.022	600	8K-23104	DF-203	817-02	PT4123	
C83	.022	200	8K-23082	DF-203	817-03	PT4122	
C84	62	500	8F3-113	D6-620	801-620		
C85	82	500	8F3-113	D6-820	801-820		
C86	.047	400	8K-23094	DF-503		PT4147	
C87	.033	200	8K-23081	DF-303	817-01	PT4123	
C88	.47	200	8K-23087			PT4047	
C89	.047	200	8K-23083	DF-503		PT4147	
C90	270	500	8F8-335	TCZ-270	MP0-336-271	MC2S41	
C91	.01	600	8M-24439				
C92	1000	500	8F7-125		811-102	MC3S56	
C93	82	500	8F3-113	D6-820	801-820		
C94	.001	600	8K-23099	D6-102	GP2L-102	PT521	
C95	.047	400	8K-23094	DF-503		PT4147	
C96A	5000		8G-23790	DD2-502	811-005	DC-525	
B	5000				811-005	DC-525	
C97	.1	500	8K-23106	DF-104		PT401	
C98	.15	300	8K-23085			PT4015	
C99	22	5000	8G-24719	DD60-220	6KV-220	DC30432	
C100	33	5000	8G-24710	DD60-330	6KV-330	DC30422	
C101	68	1500	8G-24709	DD30-680	1R6KV-680	DC30468	
C102	5000		8G-12965	DD-502	811-005	DC-525	
C103	5000		8G-13962	DD-502	811-005	DC-525	
C104	.01	400	8K-23091	D6-103	GP3-333-103	PT411	

Note 1. Not used in some versions.
Note 2. C59 is sound IF coupling shielded lead having 30MMF capacity.
Note 3. Some versions use .01MFD in this application (part #8K-23080).
† Items C73A, C73B, C73C, R70B and R70B are combined in one unit.
♦ Items C75A, C75B, C75C, R71A, R77B and R77C are combined in one unit.

CONTROLS

ITEM No	RATING RESIST ANCE	WATTS	REPLACEMENT DATA RAYTHEON Part No	CENTRALAB Part No	CLAROSTAT Part No	IRC Part No	MALLORY Part No	INSTALLATION NOTES
R1A	500KΩ	½	10A-24985	F1-40	RT7-529	QJ-808♦	UF55L	Brightness (Panel)
B	1Meg			R2-52			UR16A) †	Vertical (Rear) Attach to R1A.
C	Switch			KB-1			US-26)	Attach to R1B.
R2A	1 Meg	½	10B-24592	F1-51	RT7-529	QJ-809♦♦	UF16L) ‡	Bass (Panel)
B	1Meg	½		R2-51			UR16L)	Treble (Rear)Attach to R2A.
R3A	15KΩ	½	10B-24097	A8T-154			QJ7-113X	Picture (Tap at 10KΩ)
B	Shaft		Not Req.	AK-3			Not Req.	Attach to R3A.
R4A	150KΩ	½	10B-24163-1	F1-32	RT7-530	QJ-773††	UH1248	Vertical Hold (Panel)
B	50KΩ	½		R2-39				Horizontal Hold (Rear)
R4A	150KΩ	½	10B-24342-1	F1-32	RT7-530	QJ-773††	UH1248	Attach to R4A.
B	50KΩ	½		R2-39				Vertical Hold) Used as an Horizontal Hold) alternate in some versions.
R5A	3Meg	½	10B-23698	A8-54	A47-3Meg-S	QJ1-140	TA36L	Vertical Size
B	Shaft		Not Req.	AK-1	FKS-1/4	RQ	Not Req.	Attach to R5A.
R6A	5000Ω	½	10B-23407	AB-10♦	A47-5000-S♦	QJ1-114♦	TA35L♦	Vertical Linearity (Stop at 5000Ω)
B	Shaft		Not Req.	AK-1	FKS-1/4	RQ	Not Req.	Attach to R6A.
R7A	50KΩ	½	10B-23694	AB-31	A43-50K-S	QJ1-133		AGC Threshold
B	Shaft		Not Req.	AS-19	RM-3	TQ		Attach to R7A.
R7	50KΩ	½	10B-23684					AGC Threshold (Used as an alternate in some versions)
R8	750Ω	2	10D-23857		39-750			Bus (Wire Wound)

♦Connect a 100Ω resistor in series with the right hand terminal of the control and the lead connecting to the same terminal of the original control (control viewed from shaft end, terminals down).
††Universal Replacement (Mallory Exact Duplicate Part No. UE14865).
♦ Universal Replacement (Mallory Exact Duplicate Part No. UE1676).
♦ Concentrikit Equivalent; K-2 Kit, Base Elements and Shafts; B11-123, P1-102 (Panel)
B13-127, R2-117 (Rear)
76-1 (Switch)
♦♦Concentrikit Equivalent; K-2 Kit, Base Elements and Shafts; B11-127, P1-103 (Panel)
B11-127, R2-124 (Rear)
††Concentrikit Equivalent; K-2 Kit, Base Elements and Shafts; B11-128, P1-109 (Panel)
B11-123, R2-124 (Rear)

RESISTORS

ITEM No.	RATING OHMS	WATT	REPLACEMENT DATA RAYTHEON PART No.	IRC PART No.	NOTES
R9	220KΩ	½	9B1-27	BTS-220K	
R10	220KΩ	½	9B1-27	BTS-220K	
R11	8200Ω	½			
R12	2200Ω	½			
R13	220KΩ	½	9B1-27	BTS-220K	
R14	220KΩ	½	9B1-27	BTS-220K	
R15	47KΩ	½	9B1-83	BTS-47K	
R16	22KΩ	½	9B1-78	BTS-22K	
R17	270KΩ	½		BTS-270K	
R18	180KΩ	½		BTS-180K	
R19	68KΩ	½		BTS-68K	
R20	100KΩ	½	9B1-88		

ITEM No.	RATING OHMS	WATT	REPLACEMENT DATA RAYTHEON PART No.	IRC PART No.	NOTES
R21	100KΩ	½	9B1-88		
R22	100KΩ	½	9B1-88		
R23	15KΩ	½			
R24	8200Ω	½			
R25	10KΩ	½			
R26	150KΩ	½			
R27	3300Ω	1			BTA-3300
R28	1000Ω	1			BTA-1000
R29	1000Ω	5	9B1-62		BTS-1000
R30	4700Ω	½	9B1-70		BTS-4700
R31	1000Ω	1	9B1-62		BTA-1000
R32	47Ω	½	9B1-48		BTS-47

RESISTORS (cont)

ITEM No.	RATING OHMS	WATT	REPLACEMENT DATA RAYTHEON PART No.	IRC PART No.	NOTES
R33	47KΩ	½	9B1-83	BTS-1000	
R34	1000Ω	½	9B1-83	BTS-1000	
R35	1000Ω	½	9B1-83	BTS-1000	
R36	47Ω	½	9B1-48	BTS-47	
R37	47KΩ	½	9B1-83		
R38	1000Ω	½	9B1-83	BTS-1000	
R39	150Ω	½	9B1-53	BTS-150	
R40	3900Ω	½	9B1-68	BTS-3900	
R41	22KΩ	½	9B1-78	BTS-22K	
R42	2700Ω	½	9B4-71	BTS-2700	
R43	22KΩ	½	9B1-78	BTS 22K	
R44	100KΩ	½	9B1-88	BTS-100K	
R45	1000Ω	½	9B1-62	BTS-1000	
R46	22KΩ	½	9B1-78	BTS-22K	
R47	330K	½	9B1-93	BTS-330K	
R48	680KΩ	½	9B1-98	BTS-680K	
R49	330KΩ	½	9B1-93	BTS-330K	
R50	1.5Meg	½	9B1-99	BTS-1.5Meg	
R51	2.2Meg	½	9B1-103	BTS-2.2Meg	Note 1
R52	470KΩ	½	9B1-94	BTS-470K	Note 2
R53	100KΩ	½	9B1-88	BTS-100K	
R54	12Meg	½	9B1-111	BTS-12Meg	
R55	100KΩ	½	9B1-88	BTS-100K	
R56	33KΩ	½	9B3-80	BTA-33K	
R57	47Ω	½	9B1-48	BTS-47	
R58	18KΩ	½	9B4-77	BTS-18K	
R59	680Ω	½	9B1-60	BTS-680	
R60	220KΩ	½	9B1-90	BTS-220K	
R61	220KΩ	½	9B1-90	BTS-220K	
R62	4700Ω	½	9B1-70	BTS-4700	
R63	270KΩ	½	9B1-90	BTS-220K	
R64	470KΩ	½	9B1-94	BTS-470K	
R65	22KΩ	½	9B1-78	BTS-22K	
R66	470KΩ	½	9B1-94	BTS-470K	Note 2
R67	150Ω	1	9B3-52	BTA-150	
R68	2700Ω	2	9B4-67	BTS-2700	
R69	22KΩ	½	9B1-78	BTS-22K	
R70A	220KΩ	½	†17A-34213	BTS-220K	
B	2.2Meg			BTS-2.2Meg	
R71	150KΩ	½	9B1-88	BTS-150K	
R72	100KΩ	½	9B1-88	BTS-100K	

ITEM No.	RATING OHMS	WATT	REPLACEMENT DATA RAYTHEON PART No.	IRC PART No.	NOTES
R73	22KΩ	½	9B1-78	BTS-22K	
R74	1Meg	½	9B1-98	BTS-1Meg	
R75	4700Ω	1	9B3-70	BTA-4700	
R76	1000Ω	½	9B1-62	BTS-1000	
R77A	22KΩ	½		BTS-22K	
B	8200Ω	½	♦17A-32378	BTS-8200	
C	8200Ω	½		BTS-8200	
R78	47KΩ	½	9B1-83	BTS-47K	
R79	4700Ω	½	9B1-70	BTS-4700	
R80	2.35Meg	½	9B4-91	BTS-2.35Meg	
R81	82KΩ	½	9B1-85	BTS-82K	
R82	2.2Meg	½	9B1-103	BTS-2.2Meg	
R83	100KΩ	½	9B1-88	BTS-100K	
R84	1500Ω	5	9C1S-1101	PWT-1500	
R85	560Ω	½	9B1-59		
R86	560Ω	½	9B1-59		
R87	330KΩ	½	9B1-93		
R88	820KΩ	½	9B1-97	BTS-820K	
R89	39KΩ	½	9B1-81	BTS-39K	
R90	18KΩ	½	9B1-77		
R91	4700Ω	½	9B1-17		
R92	3900Ω	1	9B3-69	BTS-3900	
R93	68KΩ	½	9B1-84		
R94	220KΩ	½	9B1-90		
R95	100KΩ	½	9B1-88	BTS-100K	
R96	68KΩ	½	9B1-84		
R97	27KΩ	1	9B3-79		
R98	82KΩ	½	9B1-85		
R99	68KΩ	½	9B1-84		
R100	100Ω	½	9B1-50	BTS-100	
R101	470KΩ	½	9B1-94	BTS-470K	
R102	8200Ω	2	9B4-73		
R103	4.7Ω	5	9C1-1071	BWJ-4.7	
R104	3700Ω	3	9C1J-1104		
R105	2800Ω	5	9C-34033	PWT-2500	
R106	5.6Ω	5	9C1-1078	BWJ-5.6	
R107	56Ω	5	9C1J-1084		
R108	5.6Ω	5	48M-22301		
R109	820KΩ	½	9B1-90	BTS-220K	
R110	330KΩ	½	9B1-93	BTS-330K	
R111	470KΩ	½	9B1-29	BTS-470K	Note 2

Note L. In some versions a 330KΩ ½W resistor is used in this application.
Note 2. Not used in some versions.
† Items C73A, C73B, C73C, R70A, R70B are combined in one unit.
♦ Items C75A, C75B, C75C, R71A, R77B, R77C are combined in one unit.

TRANSFORMER (FILAMENT)

ITEM No.	RATING PRI.	SEC. 1	SEC. 2	SEC. 3	REPLACEMENT DATA RAYTHEON PART No.	Halldorson PART No.	Merit PART No.	Stancor PART No.	Thordorson PART No.	Triad PART No.
T1	117VAC	12.6VCT			18D-23699		P-9959	P-8130	26F67 ①	
	② 29A	② 2.4A								

① Drill one new mounting hole.

TRANSFORMERS (SWEEP CIRCUITS)

ITEM No	USE	RAYTHEON PART No.	Halldorson PART No.	Merit PART No.	RCA TYPE No	Rom PART No.	Stancor PART No.	Thordorson PART No.	Triad PART No.
T2	Horiz. Output Trans.	12E-24612-1							
T3	Vert. Output Trans.	12E-23726	21804	A-3037	222T1	V313	A-8123	26S52	A-102X
		12E-19048-2 ①	21804	A-3037	222T1	V313	A-8123	26S52	A-102X
T4A	Yoke-Horiz.(85MH)	30L-24632-1		MDF-75	Y70P25④	DY-15A④			Y-10-15④
B	Vert.(41.5MH)			④④		⑤			⑤

① Alternate vertical output transformer.
② Use original yoke rear cover and centering device.
④ Use original horizontal damping network.

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	IMPEDANCE PRI	SEC	REPLACEMENT DATA RAYTHEON PART No.	Halldorson PART No.	Merit PART No.	Stancor PART No.	Thordorson PART No.	Triad PART No.	NOTES
T5	6.7KΩ	3.3Ω	18C-24591	21H15 ①	A-3030④	A-3530	26S48 ③	S-8X	① Use 4Ω secondary tap. ③ Drill one new mounting hole.

SPEAKER

ITEM No.	RATINGS SIZE	FIELD	V C. IMP	REPLACEMENT DATA RAYTHEON PART No.	QUAM PART No.	NOTES
SP1	4"	PM	5.9Ω	18A-24153	4A07	
SP2	4"	PM	5.9Ω	18A-24183	4A07	
SP3	10"	PM	3.5Ω	18A-24176	10A6A	

COILS (RF-IF)

ITEM No.	USE	DC RES. PRI.	SEC.	REPLACEMENT DATA RAYTHEON PART No.	MEISSNER PART No.	MERIT PART No.	MILLER PART No.	NOTES
L1	UHF Ant. Coil	0Ω CT						
L2	Fil. Choke	0Ω		83-64245				
L3	Fil. Choke	0Ω		83-64245				
L4	Cathode Choke	0Ω		83-64246				
L5	UHF Mixer Coil	0Ω						
L6	UHF Osc. Coupling Coil	0Ω						
L7	UHF IF Output	0Ω		83C-64681				Tapped
L8A	VHF Ant. Coil	0Ω CT	0Ω	103G-24771				Channel 2

COILS (cont)

ITEM No.	USE	DC RES. PRI.	SEC.	REPLACEMENT DATA RAYTHEON PART No.	MEISSNER PART No.	MERIT PART No.	MILLER PART No.	NOTES
B	VHF Ant. Coil	0Ω CT	0Ω	103G-24772				Channel 3
C	VHF Ant. Coil	0Ω CT	0Ω	103G-24773				Channel 4
D	VHF Ant. Coil	0Ω CT	0Ω	103G-24774				Channel 5
E	VHF Ant. Coil	0Ω CT	0Ω	103G-24775				Channel 6
F	VHF Ant. Coil	0Ω CT	0Ω	103G-24776				Channel 7
G	VHF Ant. Coil	0Ω CT	0Ω	103G-24777				Channel 8
H	VHF Ant. Coil	0Ω CT	0Ω	103G-24778				Channel 9
I	VHF Ant. Coil	0Ω CT	0Ω	103G-24779				Channel 10
J	VHF Ant. Coil	0Ω CT	0Ω	103G-24780				Channel 11
K	VHF Ant. Coil	0Ω CT	0Ω	103G-24781				Channel 12
L	VHF Ant. Coil	0Ω CT	0Ω	103G-24782				Channel 13
L9	UHF IF Strip	0Ω	0Ω	103G-24789				Includes 100MMF cap.
L10	Neut. Coil	0Ω		103G-24785				
L11A	VHF Fil., Mixer Grid & Osc. Coils	0Ω		103G-24783				Channel 2
B	VHF Fil., Mixer Grid & Osc. Coils	0Ω		103G-24784				Channel 3
C	VHF Fil., Mixer Grid & Osc. Coils	0Ω		103G-24785				Channel 4
D	VHF Fil., Mixer Grid & Osc. Coils	0Ω		103G-24786				Channel 5
E	VHF Fil., Mixer Grid & Osc. Coils	0Ω		103G-24787				Channel 6
F	VHF Fil., Mixer Grid & Osc. Coils	0Ω		103G-24788				Channel 7
G	VHF Fil., Mixer Grid & Osc. Coils	0Ω		109G-24789				Channel 8
H	VHF Fil., Mixer Grid & Osc. Coils	0Ω		103G-24790				Channel 9
I	VHF Fil., Mixer Grid & Osc. Coils	0Ω		103G-24791				Channel 10
J	VHF Fil., Mixer Grid & Osc. Coils	0Ω		103G-24792				Channel 11
K	VHF Fil., Mixer Grid & Osc. Coils	0Ω		103G-24793				Channel 13
L	VHF Fil., Mixer Grid & Osc. Coils	0Ω		103G-24794				Channel 13
L12	UHF IF Coil	0Ω	0Ω	103G-24798				Includes 5.6KΩ resistor
L13	Fil. Choke	0Ω		103G-24797				
L14	Conv. Plate	1Ω		103G-24796				
L15	1st. Video IF		.1Ω	13A-24203	17-5002 ♦	TV-127 ♦	6232 ♦	Includes 41.25MC trap
L16	2nd. Video IF		.1Ω	13A-24324	17-5001 ♦	TV-125 ♦	6231 ♦	Includes 47.25MC trap
L17	3rd. Video IF		0Ω	13A-24237	17-5003 ♦	TV-126 ♦	6233 ♦	
L18	Series Peaking Coil	2.4Ω		18A-23437	19-1004		6610	7.5 Microhenries
L19	Shunt Peaking Coil	5.2Ω		18A-24098	19-5125		6120	140 Microhenries
L20A	4.5MC trap	1.8Ω		801-25068				
B	1st. Sound IF	3.3Ω						
L21	Series Peaking Coil	5.5Ω		18A-24030	19-1180	TV-184	6180	170 Microhenries
L22	Shunt Peaking Coil	10Ω		18A-24019	19-5500		6138	480 Microhenries
L23	4.5MC Trap	1.6Ω		18A-24305	20-1004 ▲	TV-151 ▲	3689 ▲	
L24	2nd. Sound IF	.3Ω	.3Ω	201-23975			6203 ♦	
L25	Quadrature Coil	5.3Ω		201-23727	20-1005		1680	
L26	Horiz. Osc.	24Ω	60Ω	12A-24440			6212	
L27	Horiz. Stabilizer	38Ω		13M-24441	20-1049 ♦	MWC-1	6314	
L28	RF Choke	1.8Ω		18A-21701	19-1005		4612	8 Microhenries

* Cut out chassis hole, use adaptor plate and use one winding only. Add 100MMF capacitor externally.
♦ Cut out chassis hole and use adaptor plate.
▲ Drill mounting hole.
♦ Enlarge mounting hole.

FILTER CHOKE

ITEM No.	RATINGS TOTAL DIRECT CURRENT	D.C. RESISTANCE	INDUCTANCE @ CURRENT 1000 $\sim$	REPLACEMENT DATA RAYTHEON PART No.	Halldorson PART No.	Merit PART No.	Stancor PART No.	Thordorson PART No.	Triad PART No.
L29	270ADC	42Ω	.6H	18A-24655	C-9037 ①		C-3328 ①		C-33X ①

① Drill one new mounting hole.

SELENIUM RECTIFIER

ITEM No.	RATING CURRENT	REPLACEMENT DATA RAYTHEON PART No.	FEDERAL PART No.	INTERNATIONAL PART No.	MALLORY PART No.	RADIO RECEPTOR PART No.	SARKES TARZIAN PART No.	NOTES
M1	.270ADC	212-20097	1238A	MR-300	6S300	6Q4	300	
M2	.270ADC	212-20097	1238A	MR-300	6S300	6Q4	300	

CRYSTAL DIODES

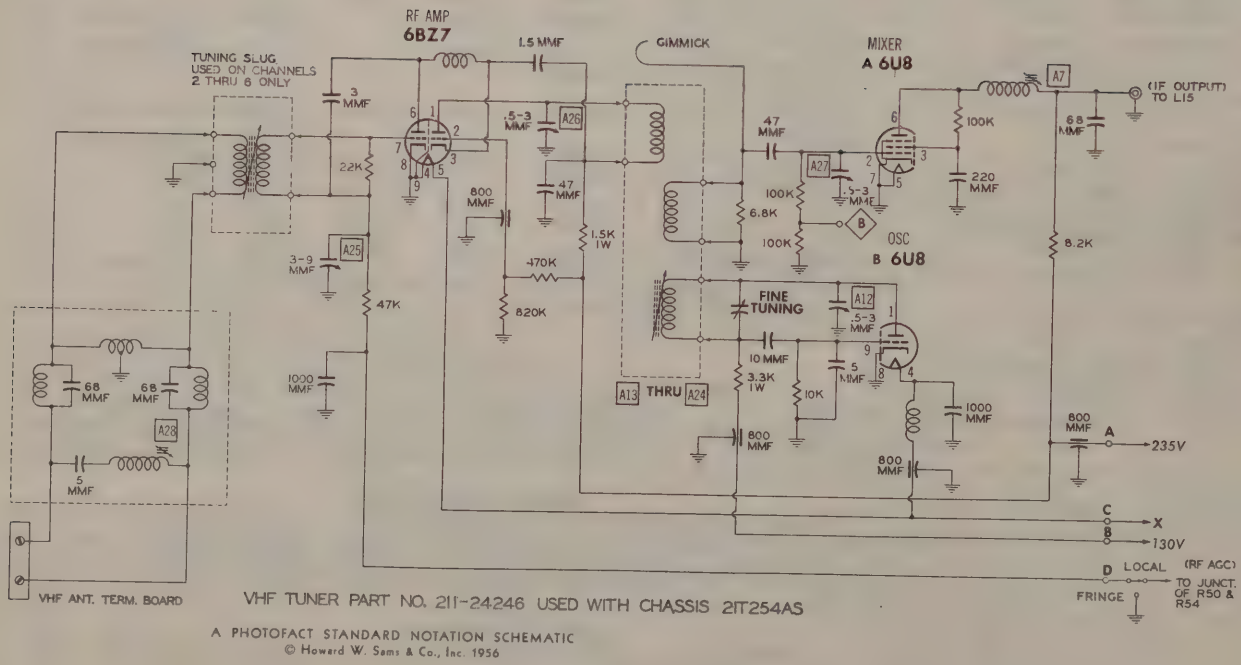
ITEM No.	ORIG. TYPE	REPLACEMENT DATA RAYTHEON PART No.	SYLVANIA PART No.	NOTES
M3	1N82A	103G-24819	1N82A	UHF Mixer-Used in chassis 21T254AGH only.
M4	CK709		1N60	Video Det.

RAYTHEON MODELS C-2169B, M, C-2174, UC-2169B, M, UC-2184 (Ch. 21T254AGH, AS)

PARTS LIST AND DESCRIPTIONS (Continued)

MISCELLANEOUS

ITEM No.	PART NAME	RAYTHEON PART No.	NOTES
M5	Dial Light		#47, Includes bracket - chassis 21T254AGH
M6	Tuner	D21I-24245	VHF - chassis 21T254AGH
		D21I-24246	VHF - chassis 21T254AS
M7	Tuner		UHF - chassis 21T254AGH
M8	Trap	103G-24800	VHF Ant. Input Filter - chassis 21T254AGH
	Trap	102S-24532	VHF Ant. Input Filter - chassis 21T254AS
M9	Video Det. Assy.	13B-24206	Includes M4, coils and capacitors
M10	Switch		Fringe (SPDT-Slide type) chassis 21T254AS
M11	Centering Device	16M-24493	
M12	Ion Trap	16M-19706	
M13	Correction		
	Magnet	16M-24935	
	Cabinet	24D-24610	Models C-2169M, UC-2169M
	Cabinet	24D-24611	Models C-2169B, UC-2169B
	Cabinet	24D-24926	Models C-2174, UC-2184
	Knob	5B-24281-A29	UHF Indicator - Models UC-2169M, UC-2169B, UC-2184
	Knob	5B-24280-A29	Fine tuning - Models UC-2169M, UC-2169B, UC-2184
	Knob	5B-24136-A29	Fine tuning - Models C-2169M, C-2169B, C-2174
	Knob	5B-24914-A76	VHF Selector - Models UC-2169M, UC-2184
	Knob	5B-24914-A93	VHF Selector - Model UC-2169B
	Knob	5B-24913-A76	VHF Selector - Models C-2169M, C-2174
	Knob	5B-24913-A93	VHF Selector - Model C-2169B
	Knob	5B-24489-A29	Contrast - Models UC-2169M, UC-2169B, UC-2184
	Knob	5B-24138-A29	Contrast - Models C-2169M, C-2169B, C-2174
	Knob	5B-24915-A76	On-off-volume - Models UC-2169M, UC-2184, C-2169M, C-2174
	Knob	5B-24915-A93	On-off-volume - Models UC-2169B, C-2169B
	Knob	5B-21205-A76	Horiz. hold and treble - Models UC-2169M, UC-2184, C-2169M, C-2174
	Knob	5B-21205-A93	Horiz. hold and treble - Models UC-2169B, C-2169B
	Knob	5B-21206-A86	Vert. Hold & bass - Models UC-2169M, UC-2184, C-2169M, C-2174
	Knob	5B-21206-A93	Vert. Hold & bass - Models UC-2169B, C-2169B
	Knob	5B-21134-A76	Brightness - Models UC-2169M, UC-2184, C-2169M, C-2174
	Knob	5B-21134-A93	Brightness - Models UC-2169B, C-2169B
	Safety Glass	30M-24908	
	Mask	25M-24598-A171	Models UC-2169M, UC-2169B, C-2169B, C-2169M
	Mask	25M-24598-A172	Models UC-2184, C-2174



VHF TUNER PART NO. 21I-24246 USED WITH CHASSIS 21T254AS

A PHOTOFACT STANDARD NOTATION SCHEMATIC

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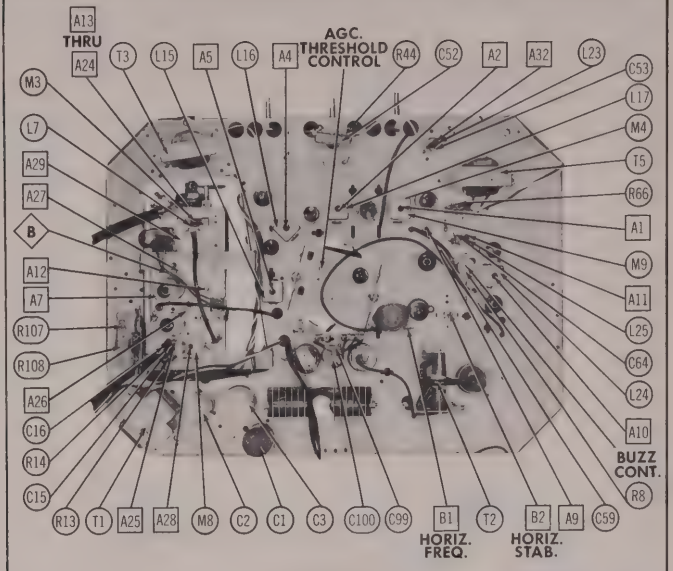
ALTERNATE VHF TUNER SCHEMATIC



CHASSIS TOP VIEW

PROPERTY OF
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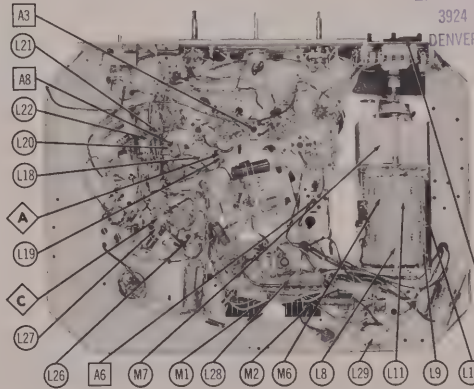
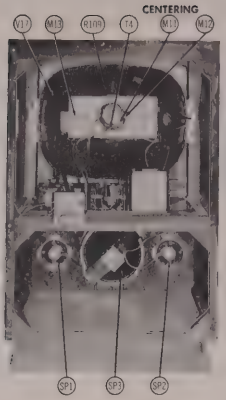
3924 MEADE ST
DENVER, COLORADO



CHASSIS BOTTOM VIEW-TRANS., INDUCTOR AND ALIGNMENT IDENT.



CABINET—REAR VIEW

HORIZONTAL SWEEP CIRCUIT ADJUSTMENTS

Turn the set on and tune in a TV station, preferably a test pattern. Set the horizontal hold control to its mid-range position.

Connect a short jumper across the horizontal stabilizer coil (L27). Starting with the horizontal frequency slug (B1) all the way out (counter clockwise), adjust B1 in a clockwise direction until the picture synchronizes horizontally.

Remove short from across L27, connect the vertical input of an oscilloscope through a 10KΩ resistor to point ⊕. Low side to chassis.

Adjust the horizontal stabilizer slug (B2) until the broad and narrow peaks of the waveform on scope are of equal height as shown in Fig. 6. If necessary adjust the horizontal hold control to keep the picture in sync.

Remove scope from set. Picture should now remain in sync while switching off channel and back again. If not, adjust the horizontal hold control .

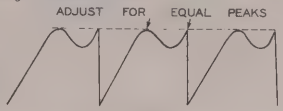
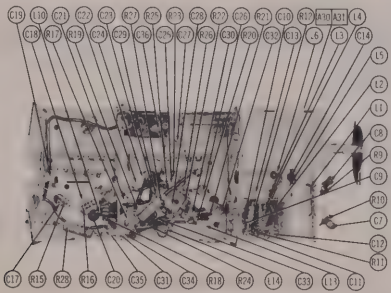


FIG 6



RF TUNER BOTTOM VIEW

PROPERTY OF
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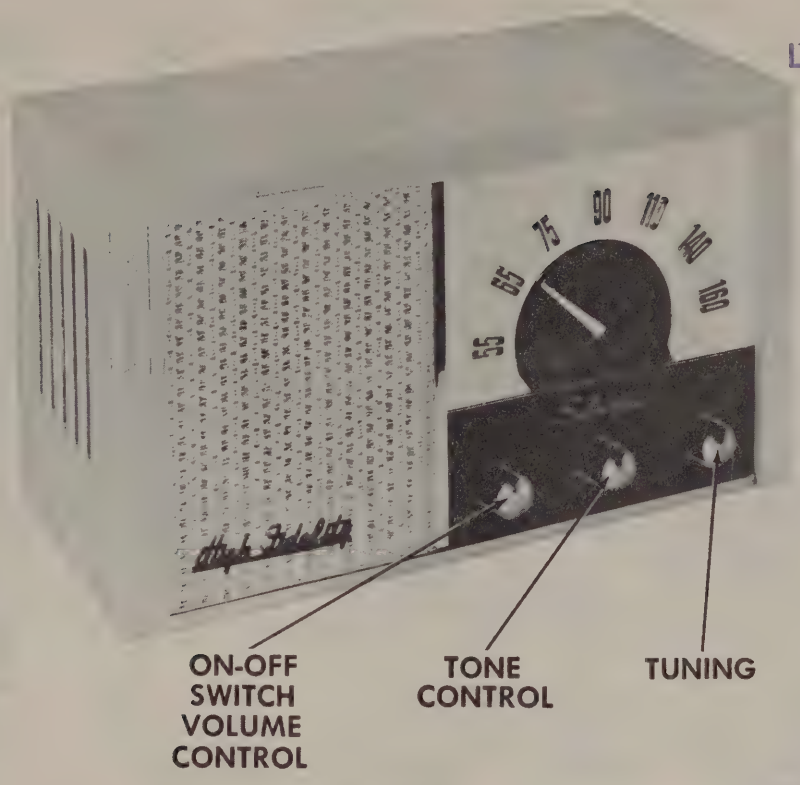
DENVER, COLORADO

SILVERTONE MODELS 5016, 5017 (Ch. 757.15001)



SILVERTONE MODELS 5016, 5017 (Ch. 757.15001)

TRADE NAME	Silvertone Models 5016, 5017 (Ch. 757.15001)
SUPPLIER	Sears Roebuck & Co., 925 S. Homan, Chicago, Ill.
TYPE SET	AC-DC Operated AM Superheterodyne Receiver
TUBES (Six)	Types 12BA6 RF Amp., 12BE6 Conv., 12BA6 IF Amp., 12AV6 Det.-AVC-AF Amp., 35L6GT Output, 35W4 Rectifier
POWER SUPPLY	105-120 Volts AC-DC
RATING	.26 Amp. @ 117 Volts AC
TUNING RANGE—BROADCAST	540KC-1640KC

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

Volume control should be at maximum position. Output of signal generator should be no higher than necessary to obtain an output reading. Use an insulated alignment screwdriver for adjusting.
Loop should be maintained in same relative position to chassis as when receiver is in cabinet.
Use isolation transformer, if available. If not, connect a .1MFD capacitor in series with low side of signal generator and B-.
To set pointer, turn tuning capacitor fully closed and set pointer parallel with base of dial.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	RADIO DIAL SETTING	OUTPUT METER	ADJUST	REMARKS
1.	.05MFD	High side to pin 7 (grid) of 12BE6 (V2). Low side to B-.	455KC (400~ Mod.)	Tuning gang fully open	Across Voice Coil	A1, A2, A3, A4	Adjust for maximum output. If isolation transformer is not used, reduce dummy antenna to .001MFD to reduce hum modulation.
2.	50MMF	High side to antenna terminal. Low side to B-.	1625KC	"	"	A5	"
3.	"	"	1400K	Tune to 1400KC signal	"	A6	"
4.	"	"	600KC	Tune to 600KC signal	"	A7	"
5.	"	Loop	1400KC	Tune for maximum signal.	"	A8	Fashion loop of several turns of wire and radiate signal into loop of receiver. Adjust for maximum output. Check calibration at 1400KC, 1000KC, & 600KC.

HOWARD W. SAMS & CO., INC. • Indianapolis 5, Indiana

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PARTS LIST AND DESCRIPTIONS

TUBES (SYLVANIA, GENERAL ELECTRIC, WESTINGHOUSE)

ITEM No.	USE	REPLACEMENT DATA: SILVERTONE PART No.	REPLACEMENT DATA: STANDARD REPLACEMENT	RETMA BASE TYPE	NOTES
V1	RF Amp.	12BA6	12BA6	7BK	
V2	Converter	12BE6	12BE6	7CH	
V3	IF Amp.	12BA6	12BA6	7BK	
V4	Det. -AVC-AF Amp.	12AV6	12AV6	7BT	
V5	Audio Output	35L6GT	35L6GT	7AC	
V6	Rect.	35W4	35W4	5BQ	

ELECTROLYTIC CAPACITORS

ITEM No.	RATING: CAP.	RATING: VOLT.	REPLACEMENT DATA: SILVERTONE PART No.	MALLORY PART No.	PYRAMID PART No.	SANGAMO PART No.	NOTES
C1A	60	150	E324	TCT3117	TDL-804020-150	FMT-333	Red
B	30	150					Blue
C	20	150					Yellow

FIXED CAPACITORS

Capacity values given in the rating column are in mfd. for Paper Capacitors, and in mmfd. Mica and Ceramic Capacitors.

ITEM No.	RATING: CAP.	RATING: VOLT.	REPLACEMENT DATA: SILVERTONE PART No.	CENTRALAB PART No.	ERIE PART No.	MALLORY PART No.	NOTES
C2	.05	400	E306A	DF-503		PT415	
C3A	220						
B	2000						
C	5000		♦E3015	♦PC150	♦1408-01		
D	250						
E							
C4	2000		E332	DD-202	801-002	DC522	
C5	.01	600	E301	D6-103	GP3-333-103	PT611	
C6	.05	400	E306A	DF-503		PT415	
C7	.05	400	E306A	DF-503		PT415	

♦ Items C3A, C3B, C3C, R7A, R7B and R7C are combined in one unit. When replacing items separately, items C3D and C3E should total 250MMF.

CONTROLS

ITEM No.	RATING: RESISTANCE	RATING: WATTS	REPLACEMENT DATA: SILVERTONE PART No.	CENTRALAB PART No.	CLAROSTAT PART No.	IRC PART No.	MALLORY PART No.	INSTALLATION NOTES
R1A	500KΩ	½	E254	AB-60	A47-500K-Z	Q13-133	U-48	Volume
B	Shaft		Not Req.	AK-4	KSS-3	Not Req.	Not Req.	Attach to R1A.
C	Switch		Not Req.	KB-1	SWE-12	76-1	US-26	Attach to R1A.
R2A	1Meg	½	E257	AB-69	A47-1Meg-S	Q11-137	U-54	Tone
B	Shaft		Not Req.	AK-4	KSS-3	Not Req.	Not Req.	Attach to R2A.

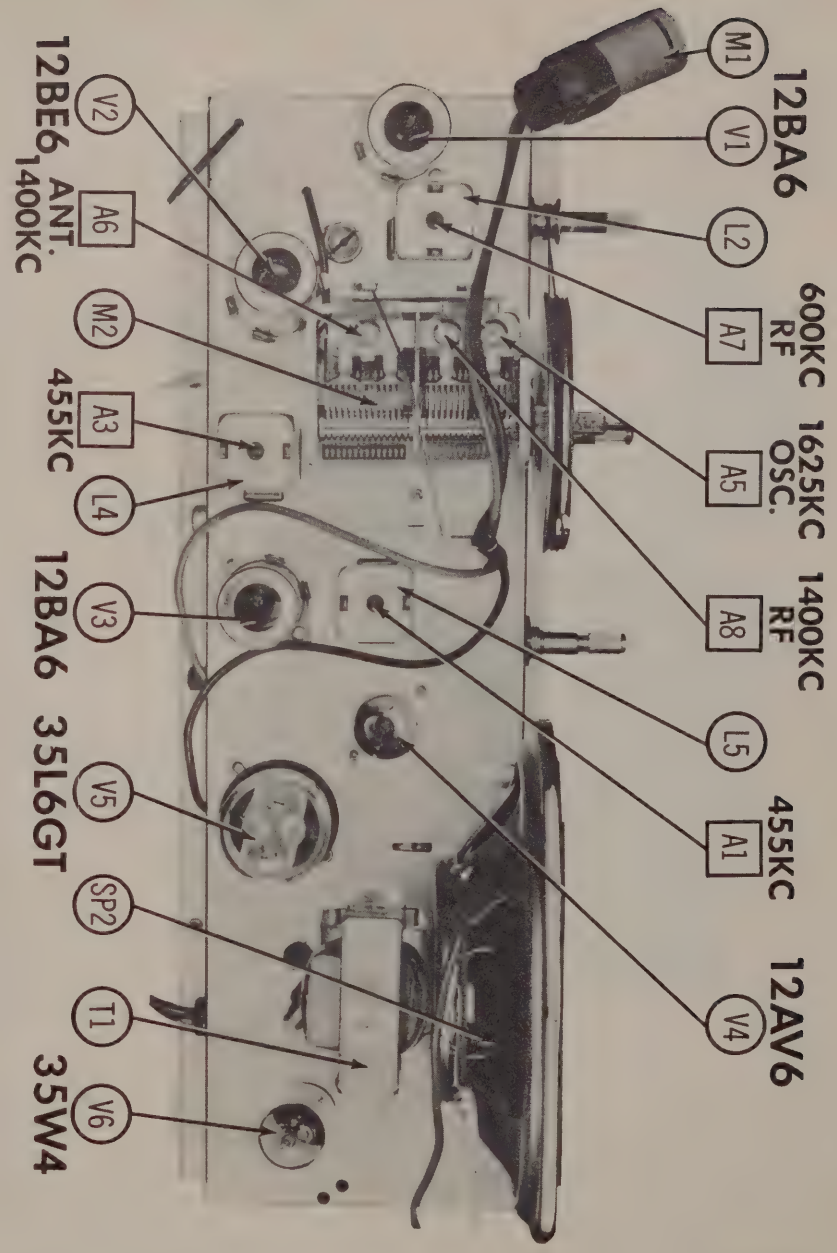
RESISTORS

ITEM No.	RATING: OHMS	RATING: WATT	REPLACEMENT DATA: SILVERTONE PART No.	IRC PART No.	NOTES
R3	220Ω	½		BTS-220	
R4	22KΩ	½		BTS-22K	
R5	3.3Meg	½		BTS-3.3Meg	
R6	150Ω	½		BTS-150	

ITEM No.	RATING: OHMS	RATING: WATT	REPLACEMENT DATA: SILVERTONE PART No.	IRC PART No.	NOTES
R7A	6.8Meg	½	♦E3015	BTS-6.8Meg	
B	470KΩ	½		BTS-470K	
C	470KΩ	½		BTS-470K	
R8	1000Ω	1		BTA-1000	
R9	120Ω	½		BTS-120	

♦ Items C3A, C3B, C3C, R7A, R7B, R7C are combined in one unit.

CHASSIS—TOP VIEW



PARTS LIST AND DESCRIPTIONS (Continued)

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	IMPEDANCE		REPLACEMENT DATA						NOTES
	PRI.	SEC.	SILVERTONE PART No.	Halldorson PART No.	Merit PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.	
T1	2. 2KΩ	3. 6Ω	Part of Spkr. E1012	Z1102	A-3031	A-3330	24S50A	S-16X	

SPEAKER

ITEM No.	RATINGS			REPLACEMENT DATA		NOTES
	SIZE	FIELD	V. C. IMP.	SILVERTONE PART No.	QUAM PART No.	
SP1	4"	PM	6. 7Ω	E1011	4A07	
SP2	6"	PM	6. 4Ω	E1012	6A1	

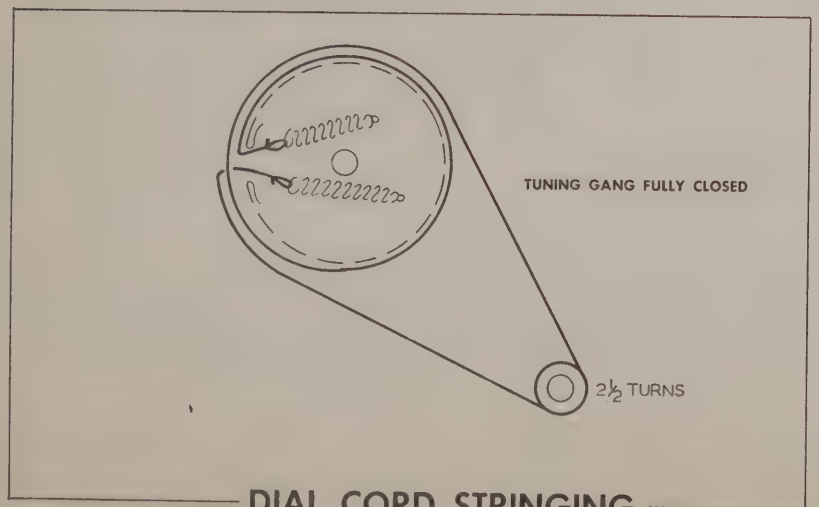
COILS (RF-IF)

ITEM No.	USE	DC RES.		REPLACEMENT DATA				NOTES
		PRI.	SEC.	SILVERTONE PART No.	MEISSNER PART No.	MERIT PART No.	MILLER PART No.	
L1	Loop Ant.	3. 2Ω		E605				
L2	RF Coil	115Ω	11Ω*	E626182	14-1010			*Tapped ② 7. 5Ω
L3	Osc. Coil	. 7Ω	7. 8Ω	E6111	14-1073▲		69-Osc. ■	
L4	Input IF	15Ω	15Ω	E6256	16-6758	BC-352	12-C1	
L5	Output IF	10. 5Ω	10. 5Ω	E62419	16-6758	BC-353	12-C2	

▲ Leads sufficient mounting support.
■ Drill new mounting hole.

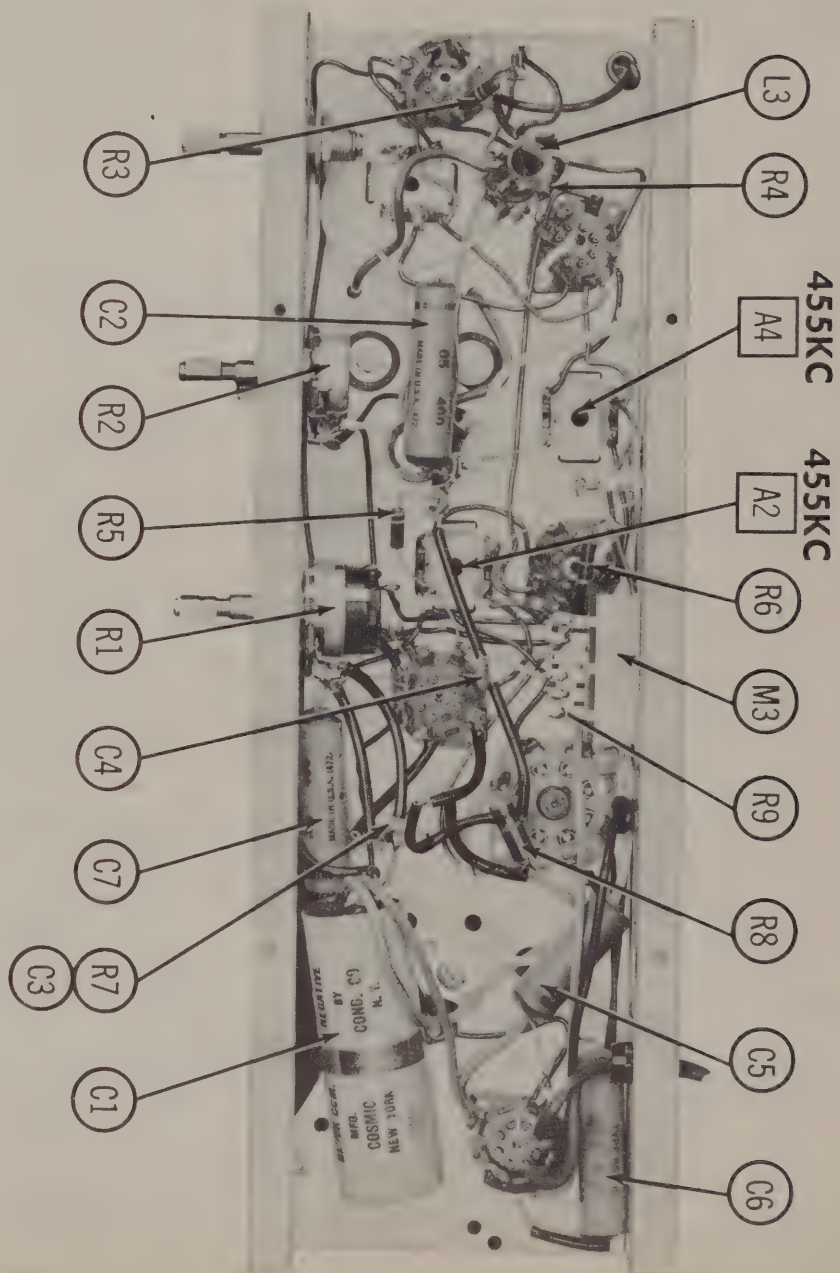
MISCELLANEOUS

ITEM No.	PART NAME	SILVERTONE PART No.	NOTES
M1	Dial Light	E47	#47
M2	Tuning Cap.	E357	3 Gang (35-435MMF, 14-240MMF, 14-105MMF)
M3	Switch	E123	Radio-Phono (DPDT-Slide Type)
	Cabinet	E7020BL	Blonde Oak
	Cabinet	E7020M	Mahogany
	Knob	E5017	Pointer
	Knob	E5012	On-Off-Volume, Tone, Tuning
	Face	E717	Front, Clear With Calibration
	Face	E718	Translucent, With Knob Hole

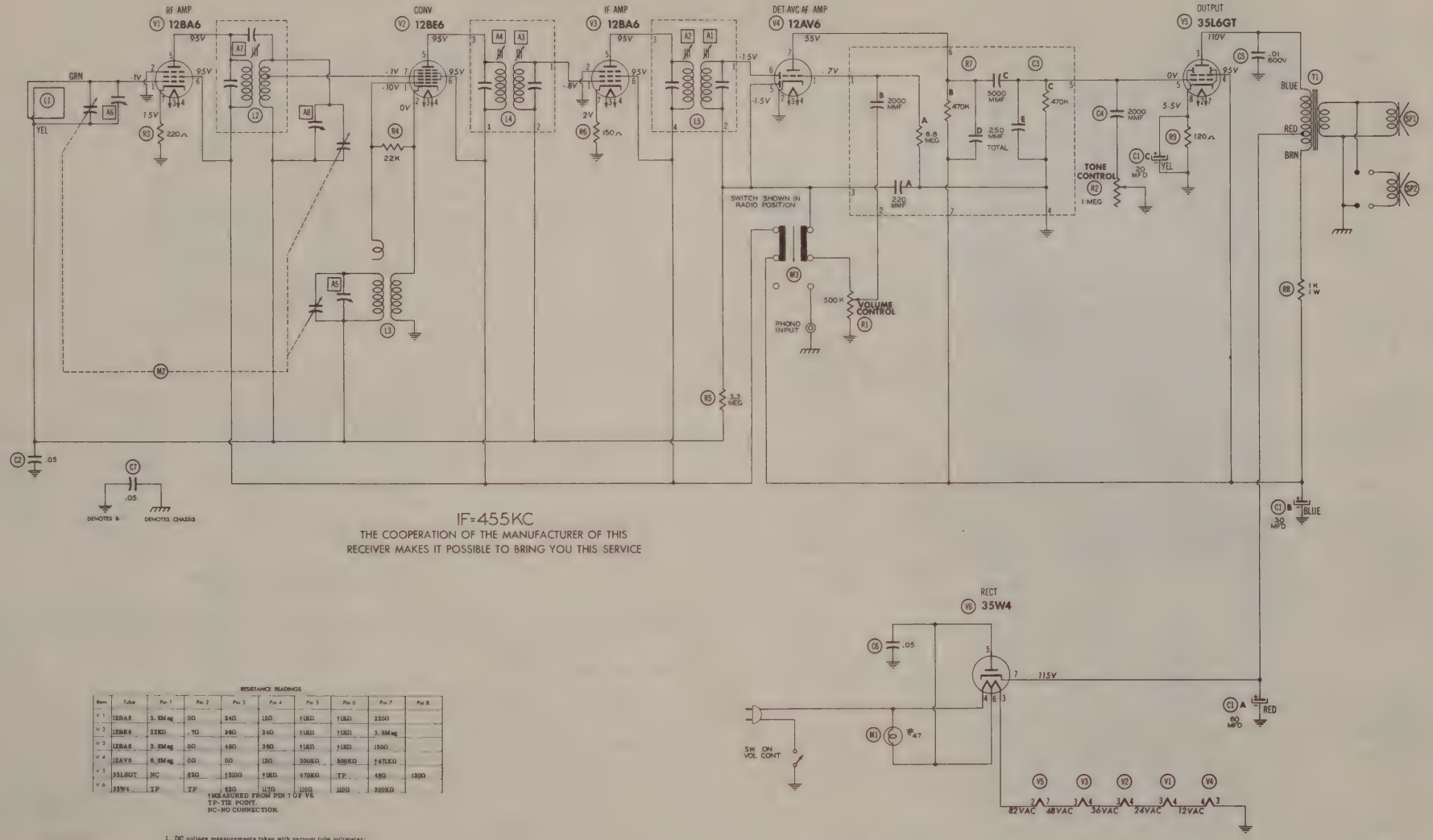


DIAL CORD STRINGING

CHASSIS—BOTTOM VIEW



SILVERTONE Model 5016



IF=455KC

THE COOPERATION OF THE MANUFACTURER OF THIS RECEIVER MAKES IT POSSIBLE TO BRING YOU THIS SERVICE

RESISTANCE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8
V 1	12BA6	3.6Meg	0Ω	24Ω	13Ω	†1KΩ	†1KΩ	220Ω	
V 2	12BE6	22KΩ	.7Ω	36Ω	24Ω	†1KΩ	†1KΩ	3.6Meg	
V 3	12BA6	3.6Meg	0Ω	48Ω	36Ω	†1KΩ	†1KΩ	150Ω	
V 4	12AV6	6.8Meg	0Ω	0Ω	13Ω	500KΩ	500KΩ	†471KΩ	
V 5	35L6GT	NC	82Ω	†210Ω	†1KΩ	470KΩ	TP	48Ω	130Ω
V 6	35W4	TP	TP	82Ω	110Ω	110Ω	110Ω	300KΩ	

†MEASURED FROM PIN 7 OF V6.
TP-TIE POINT.
NC-NO CONNECTION.

1. DC voltage measurements taken with vacuum tube voltmeter; AC voltages measured at 1000 ohms per volt.
2. Socket connections are shown as bottom views.
3. Measured values are from socket pin to common negative.
4. Line voltage maintained at 117 volts for voltage readings.
5. Nominal tolerance on component values makes possible a variation of ± 15% in voltage and resistance readings
6. Volume control at maximum, no signal applied for voltage measurements.

A PHOTOFACT STANDARD NOTATION SCHEMATIC

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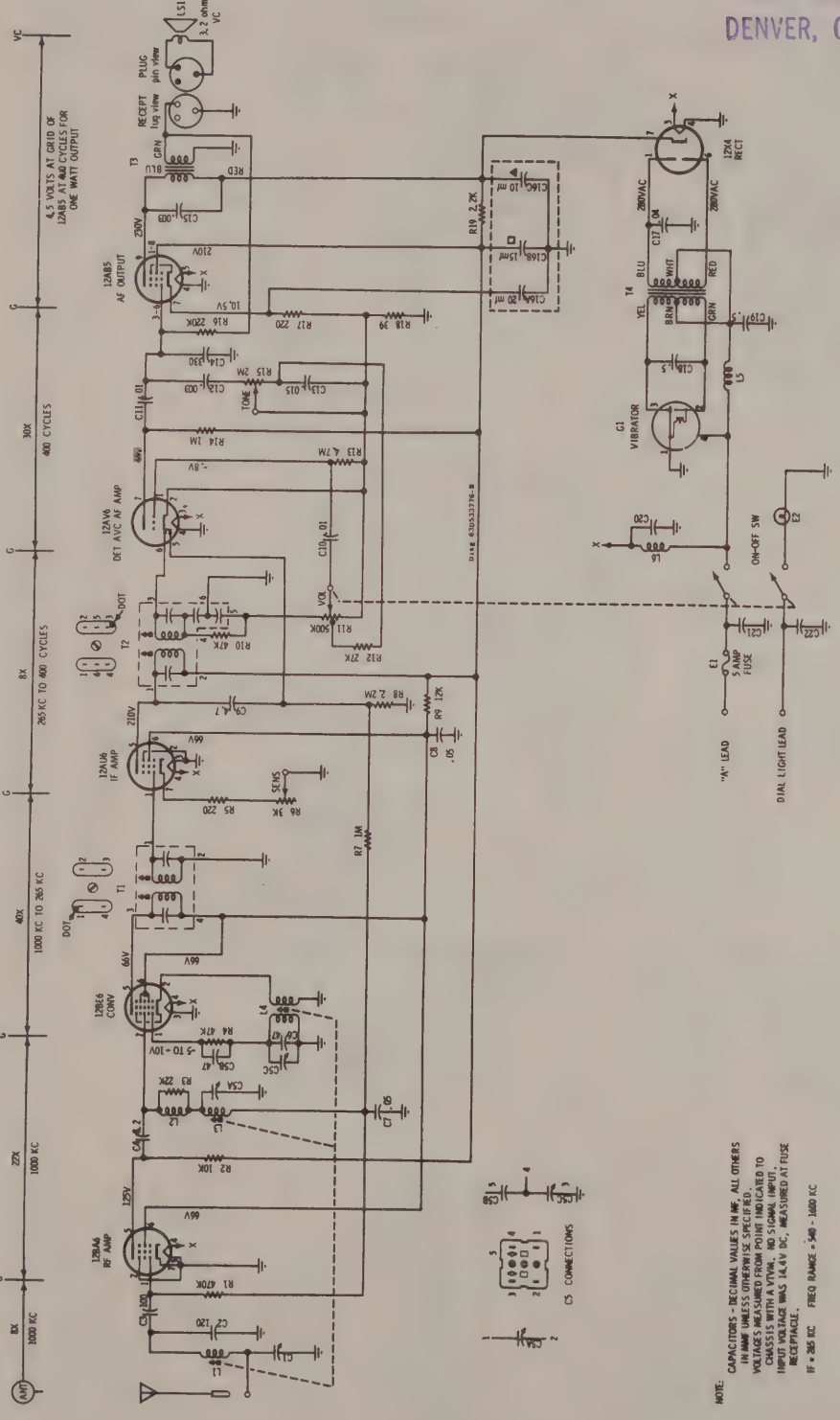
4.5 VOLTS AT GRID OF 12A85 AT 400 CYCLES FOR ONE WATT OUTPUT
12A85 AF OUTPUT
12AV6 DET AVC AF AMP
12AV6 IF AMP
12BE6 CONV
12BA6 RF AMP
12X4 RECT
VIBRATOR
ON-OFF SW
"A" LEAD
DIAL LIGHT LEAD
5 CONNECTIONS
1000 KC
1000 KC TO 265 KC
265 KC TO 400 CYCLES
400 CYCLES
NOTE: CAPACITORS - DECIMAL VALUES IN MF, ALL OTHERS IN MMF UNLESS OTHERWISE SPECIFIED.
VOLTAGES MEASURED FROM POINT INDICATED TO CHASSIS WITH A VTVM. NO SIGNAL INPUT.
INPUT VOLTAGE WAS 14.4V DC, MEASURED AT FUSE RECEPTACLE.
IF = 265 KC FREQ RANGE = 540 - 1600 KC

FORD 66 MF (FDR-18805-B1)

SCHEMATIC COURTESY MOTOROLA

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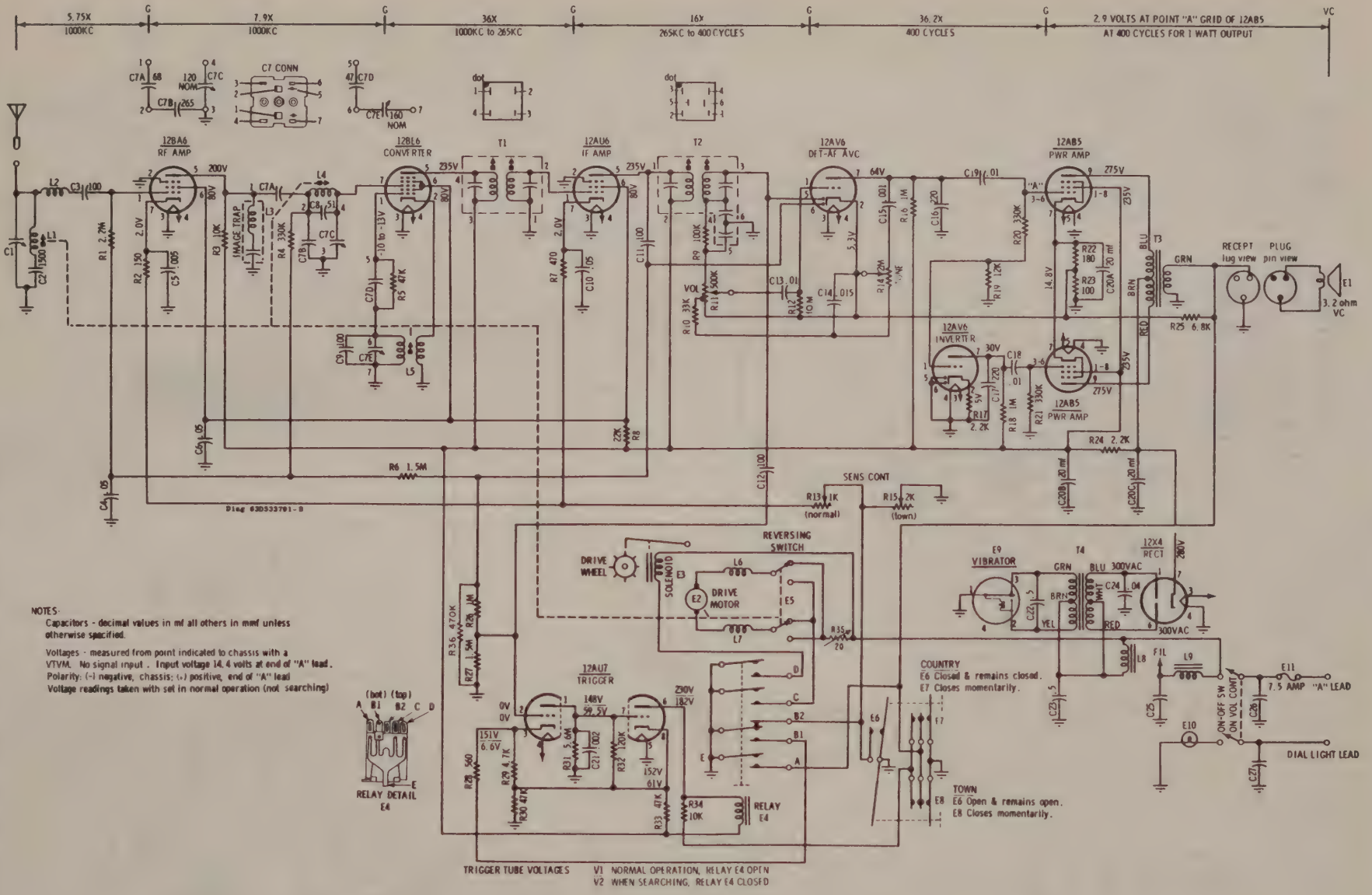

FORD 69 MF (FDR-18806-F)

SCHEMATIC COURTESY MOTOROLA

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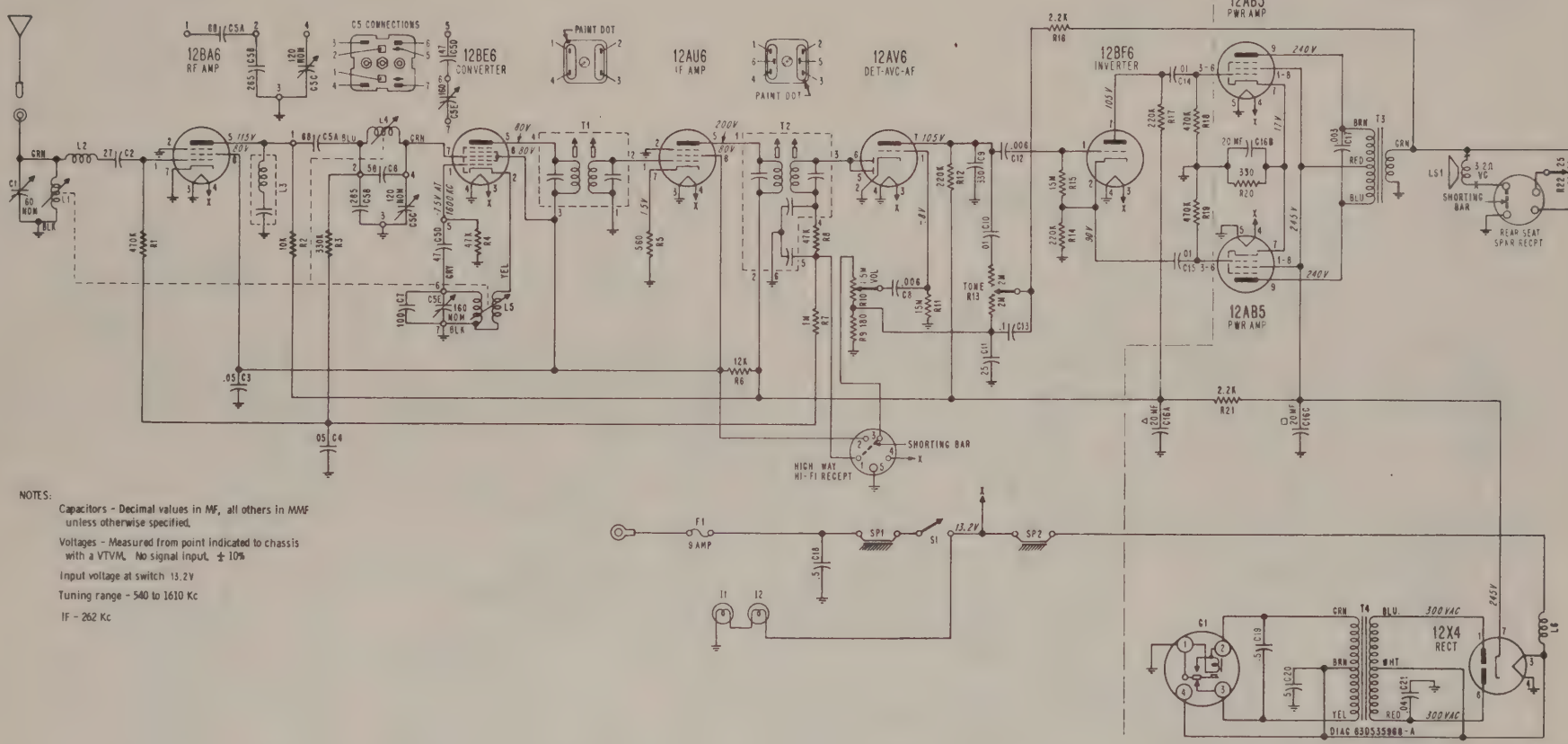


NOTES:

Capacitors - Decimal values in MF, all others in MMF unless otherwise specified.

Voltages - Measured from point indicated to chassis with a VTVM. No signal input. ± 10%

Input voltage at switch 13.2V

Tuning range - 540 to 1610 Kc

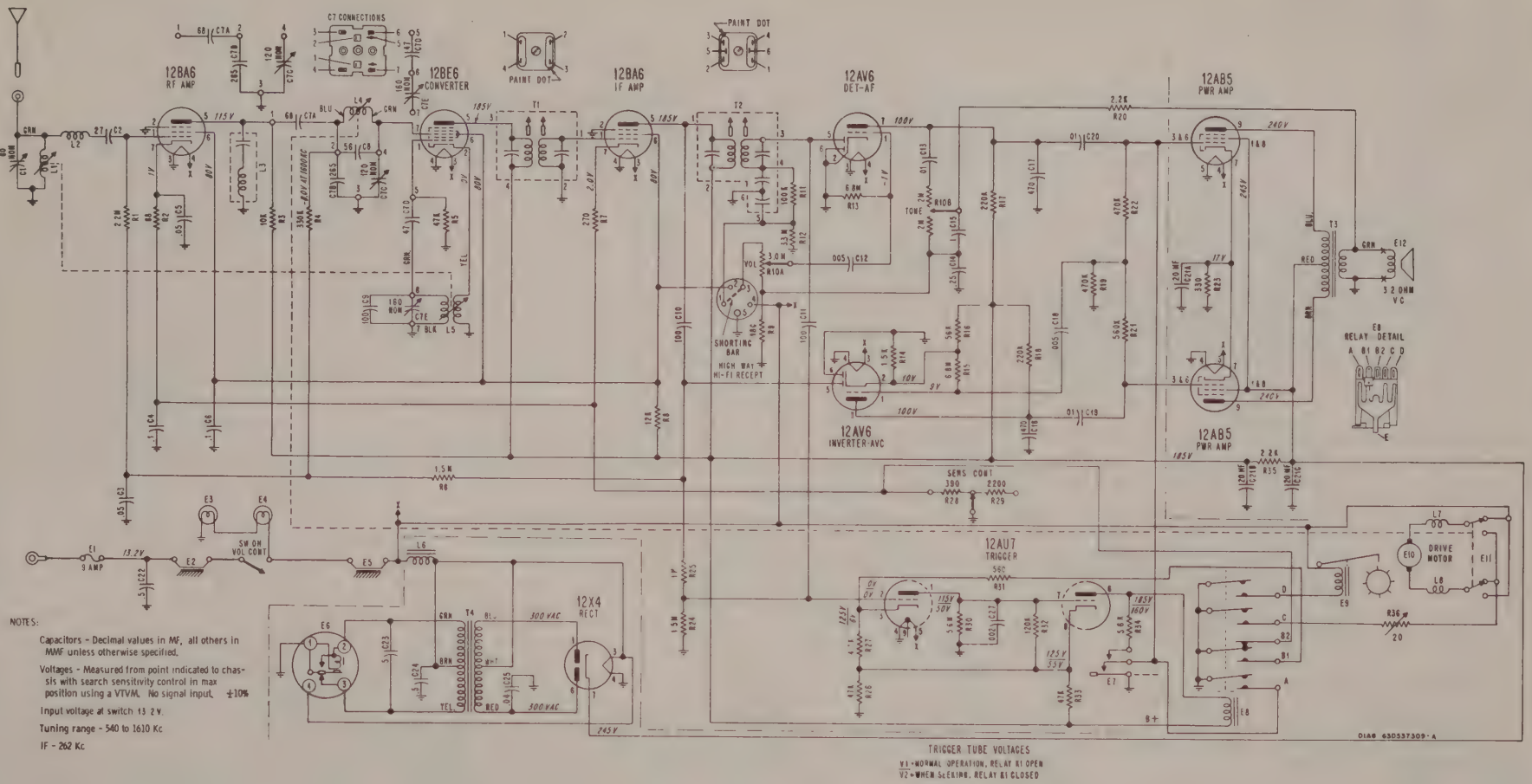
IF - 262 Kc

The High Way Hi Fi Receptical is not used in Model 841.
Junction of R7 and R8 therefore connects to high side of volume control.

SCHEMATIC COURTESY
MOTOROLA

Mopar 841
Mopar 842
Mopar 843

PROPERTY OF
L. F. BLANKENSHIP
3901 MENDE ST.
DENVER, COLORADO



NOTES:

Capacitors - Decimal values in MF, all others in MMF unless otherwise specified.

Voltages - Measured from point indicated to chassis with search sensitivity control in max position using a VTVM. No signal input. ±10%

Input voltage at switch 13.2 V.

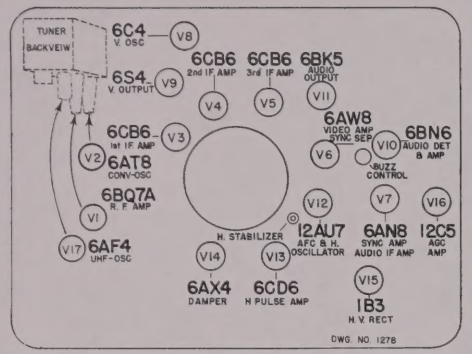
Tuning range - 540 to 1610 Kc

IF - 262 Kc

SCHEMATIC COURTESY
MOTOROLA

Mopar 916

21T41 - 21T44 - 21T46 CHASSIS

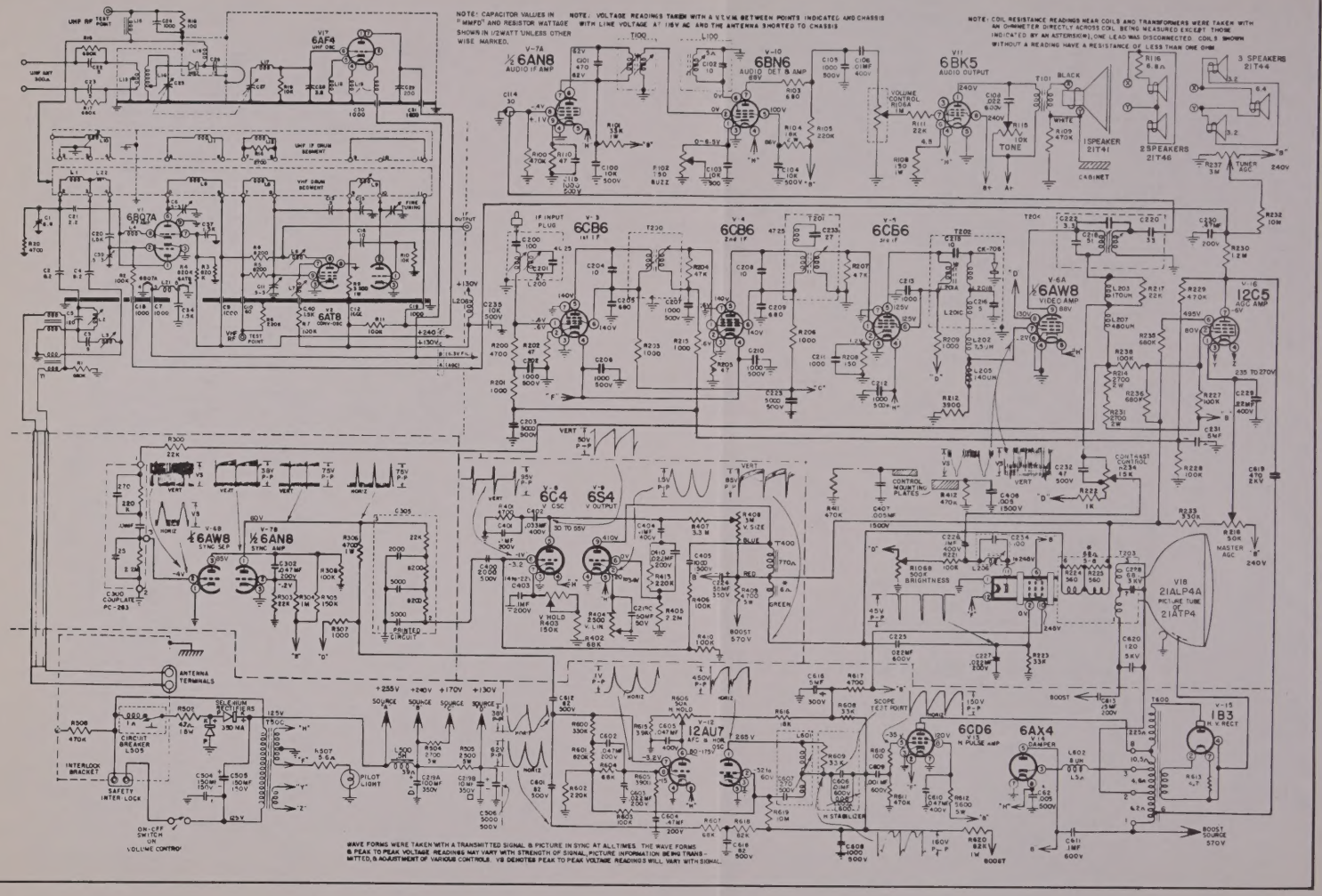


TUBE COMPLEMENT

Ref. No.	RETMA TYPE	TUBE FUNCTION
V-1	6BQ7A	R. F. Amplifier
V-2	6AT8	Oscillator-Converter
V-3-4-5	6CB6	IF Amplifier
V-6	6AW8	Video Amp.-Sync Sep.
V-7	6AN8	Sync Amp.-Audio IF Amp.
V-8	6C4	Vertical Oscillator
V-9	6S4	Vertical Output
V-10	6BN6	Audio Det. and Amp.
V-11	6BK5	Audio Output
V-12	12AU7	AFC and Horiz. Oscillator
V-13	6CD6	H. Pulse Amplifier
V-14	6AX4	Horizontal Damper
V-15	1B3	H. V. Rectifier
V-16	12C5	AGC Amplifier
V-17	6AF4	UHF Oscillator
V-18	21ALP4A or 21ATP4	Picture Tube

Model	Chassis
UC-213-B	21T41
UC-213-M	21T41
UC-215-B	21T41
UC-215-M	21T41
UC-217-B	21T46
UC-217-M	21T46
UC-219	21T44
UM-211-B	21T41
UM-211-M	21T41

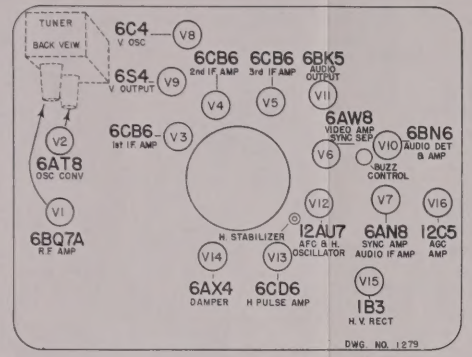
SCHEMATIC COURTESY RAYTHEON


NOTE: CAPACITOR VALUES IN "MMFD" AND RESISTOR WATTAGE SHOWN IN 1/2WATT UNLESS OTHER WISE MARKED.
NOTE: VOLTAGE READINGS TAKEN WITH A V.T.V.M. BETWEEN POINTS INDICATED AND CHASSIS WITH LINE VOLTAGE AT 115V AC AND THE ANTENNA SHORTED TO CHASSIS
NOTE: COIL RESISTANCE READINGS NEAR COILS AND TRANSFORMERS WERE TAKEN WITH AN OHMMETER DIRECTLY ACROSS COIL BEING MEASURED EXCEPT THOSE INDICATED BY AN ASTERISK(*), ONE LEAD WAS DISCONNECTED. COILS SHOWN WITHOUT A READING HAVE A RESISTANCE OF LESS THAN ONE OHM
6AF4 UHF OSC
6BQ7A
6AT8
6CB6 1st I.F.
6CB6 2nd I.F.
6CB6 3rd I.F.
6AW8 VIDEO AMP
6AN8 SYNC AMP
6C4 V. OSC
6S4 V. OUTPUT
6BN6 AUDIO DET & AMP
6BK5 AUDIO OUTPUT
12AU7 AFC & H. OSC
6CD6 H. PULSE AMP
6AX4 DAMPER
1B3 H. V. RECT
12C5 AGC AMP
21ALP4A PICTURE TUBE or 21ATP4
3 SPEAKERS 21T44
1 SPEAKER 21T41
2 SPEAKERS 21T46
CABINET
TONE
VOLUME CONTROL R106A 1M
BRIGHTNESS
CONTRAST CONTROL R234 15K
MASTER AGC
H. STABILIZER
V. HOLD R403 150K
V. SIZE
V. LIN
H. HOLD R506 50K
SCOPE TEST PORT
CONTROL MOUNTING PLATES
ANTENNA TERMINALS
CIRCUIT BREAKER L505
INTERLOCK BRACKET
SAFETY INTER LOCK
ON-OFF SWITCH ON VOLUME CONTROL
PILOT LIGHT
SELENIUM RECTIFIER 350 MA
+255V SOURCE A
+240V SOURCE B
+170V SOURCE C
+130V SOURCE D
BOOST 570V
WAVE FORMS WERE TAKEN WITH A TRANSMITTED SIGNAL & PICTURE IN SYNC AT ALL TIMES. THE WAVE FORMS & PEAK TO PEAK VOLTAGE READINGS MAY VARY WITH STRENGTH OF SIGNAL, PICTURE INFORMATION BEING TRANSMITTED, & ADJUSTMENT OF VARIOUS CONTROLS. V'S DENOTES PEAK TO PEAK VOLTAGE READINGS WILL VARY WITH SIGNAL.

21T40 - 21T43 - 21T45 CHASSIS

TUBE COMPLEMENT

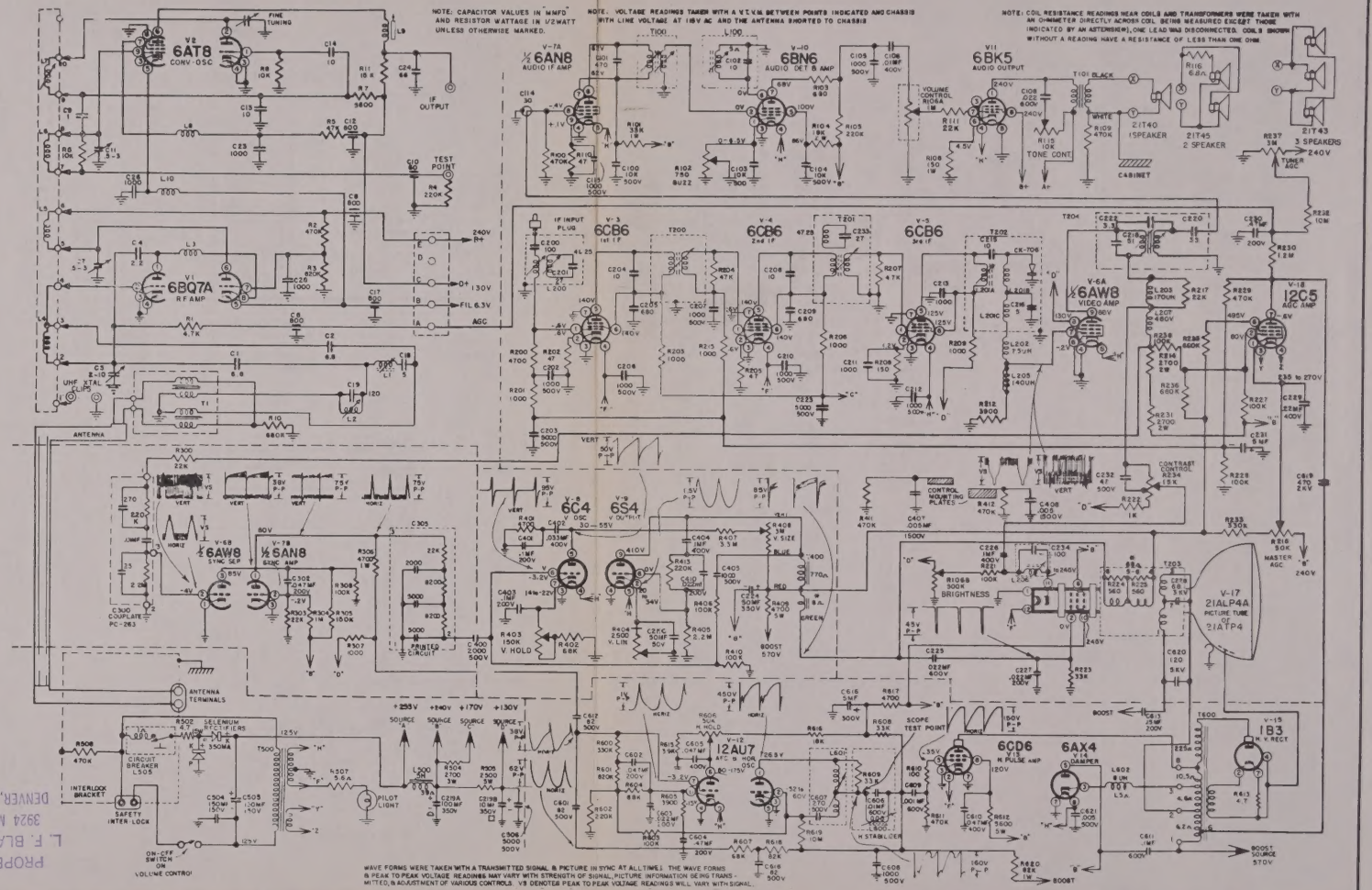
Ref. No.	RETMA TYPE	TUBE FUNCTION
V-1	6BQ7A	R. F. Amplifier
V-2	6AT8	Oscillator-Converter
V-3-4-5	6CB6	IF Amplifier
V-6	6AW8	Video Amp.-Sync Sep.
V-7	6AN8	Sync Amp.-Audio IF Amp.
V-8	6C4	Vertical Oscillator
V-9	6S4	Vertical Output
V-10	6BN6	Audio Det. and Amp.
V-11	6BK5	Audio Output
V-12	12AU7	AFC and Horiz. Oscillator
V-13	6CD6	H. Pulse Amplifier
V-14	6AX4	Horizontal Damper
V-15	1B3	H. V. Rectifier
V-16	12C5	AGC Amplifier
V-17	21ALP4A	Picture Tube
	or 21ATP4	



Model	Chassis
C-214-B	21T40
C-214-M	21T40
C-216-B	21T45
C-216-M	21T45
C-218	21T43
M-210-B	21T40
M-210-M	21T40

SCHEMATIC COURTESY RAYTHEON

PROPERTY OF
L. F. BLANKENSHIP
3924 MEADE ST.
DENVER, COLORADO


NOTE: CAPACITOR VALUES IN MMFD AND RESISTOR WATTAGE IN 1/2WATT UNLESS OTHERWISE MARKED.
NOTE: VOLTAGE READINGS TAKEN WITH A VTVM BETWEEN POINTS INDICATED AND CHASSIS WITH LINE VOLTAGE AT 115V AC AND THE ANTENNA SHORTED TO CHASSIS
NOTE: COIL RESISTANCE READINGS NEAR COILS AND TRANSFORMERS WERE TAKEN WITH AN OHMMETER DIRECTLY ACROSS COIL BEING MEASURED EXCEPT THOSE INDICATED BY AN ASTERISK(*), ONE LEAD WAS DISCONNECTED. COILS SHOWN WITHOUT A READING HAVE A RESISTANCE OF LESS THAN ONE OHM
6AT8 CONV-OSC
½6AN8 AUDIO IF AMP
6BN6 AUDIO DET & AMP
6BK5 AUDIO OUTPUT
6BQ7A R F AMP
6CB6 1st I F
6CB6 2nd I F
6CB6 3rd I F
½6AW8 VIDEO AMP
12C5 AGC AMP
6C4
6S4
½6AW8 SYNC SEP
½6AN8 SYNC AMP
12AU7 AFC & H OSC
6CD6 H PULSE AMP
6AX4 DAMPER
1B3 H V RECT
V-17 21ALP4A PICTURE TUBE OR 21ATP4
2 SPEAKER
3 SPEAKERS
CABINET
BRIGHTNESS
CONTRAST CONTROL
MASTER AGC
TONE CONT
VOLUME CONTROL
SCOPE TEST POINT
BOOST
ANTENNA
ANTENNA TERMINALS
INTERLOCK BRACKET
SAFETY INTER-LOCK
ON-OFF SWITCH ON VOLUME CONTROL
PILOT LIGHT
SELENIUM RECTIFIERS
CIRCUIT BREAKER
WAVE FORMS WERE TAKEN WITH A TRANSMITTED SIGNAL & PICTURE IN SYNC AT ALL TIMES. THE WAVE FORMS & PEAK TO PEAK VOLTAGE READINGS MAY VARY WITH STRENGTH OF SIGNAL, PICTURE INFORMATION BEING TRANSMITTED, & ADJUSTMENT OF VARIOUS CONTROLS. V3 DENOTES PEAK TO PEAK VOLTAGE READINGS WILL VARY WITH SIGNAL.